

# Assessment of Social Factors That Hinders Infants of Unmarried Young Women to Access Immunization Programme Interventions in Dar es salaam, Tanzania

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## Abstract

Tanzania introduced her Expanded Programme on Immunization (EPI), currently as known as Immunization and Vaccines Development (IVD) as project in 1975; this was one year after the 27th World Health Assembly (WHA), Agenda 57 resolution – WHA.27-57. To date, the country is having a strong national immunization programme which is delivering 7 types of vaccines combinations (namely BCG, OPV, Penta, TT, PCV-13, Rota vaccine and MR vaccines) as a major immunization programme service. This study aimed at assessing social factors that hinders accessibility of infants of un-married young women, to immunization programme services in Dar es salaam. The descriptive retrospective case control study design was deployed. A total of 214 young unmarried women aged less than 25 years were selected randomly, of which 196 were selected to participate in the study, this is 102% of the study sample size. Majority of these women were of age between 18 to 25 years (49.1%) and completed primary school (47.7%). In this study, social factors were observed to limiting the access of young unmarried women to immunization programme services. The common factors identified, were the older age group ( $p=0.015$ ), mother's education ( $p=0.293$ ) and mothers occupation ( $p=0.487$ ). Furthermore, it was perceived that, 66% of the mothers interviewed recalled 3 or more VPDs and mostly were given the immunization programme services information by health workers (67.3%,  $p=0.229$ ), listening radio spots (47.7%,  $p=0.764$ ) and some by reading posters (39.3%,  $p=0.157$ ).

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The MOHGEC in collaboration with education sector stakeholders are urged to implement interventions to reduce teenage pregnancies; improve health information sharing among adolescents/young women; and streamlining of girls education policy and empowerment. Finally health workers should be trained on effective communication skills and screening of infant's vaccination cards must be done regularly for infants seeking medical care.

**Keywords:** immunization programme services; unmarried young women; social factors hindering infants vaccination.

## **1. Introduction**

In the 21st Century, after clean water, immunization is considered to be the second most important basic human right. It is the most effective public health intervention in the world for saving lives and promoting good health [1]. The World Health Organization (WHO) initiated the Expanded Program on Immunization (EPI) in May 1974 through the 27th World Health Assembly (WHA), Agenda 57 resolution – WHA.27-57 with the objective to vaccinate children throughout the world [2]. Tanzania introduced her Expanded Programme on Immunization (EPI) which currently is known as Immunization and Vaccines Development (IVD) as project in 1975. The WHA resolution urges countries to build on the success of the global small pox eradication programme, and it wishes to ensure that all children in all countries benefit from lifesaving vaccines. Currently, WHO estimates that immunization programmes save the lives of 2.5 million people each year and protect many millions more from illness and disability [3]. In her initiation, EPI Tanzania reached less than 5 percent of children in Tanzania through vaccinating a third dose of diphtheria-tetanus-pertussis (DTP -3) containing vaccine and poliomyelitis vaccines in their first year of life [4]. By the end of 2016 Tanzania is providing 7 vaccines (with 10 antigens) according to her national immunization programme to prevent 11 vaccines preventable diseases. These vaccines are as follows; Bacilli- Calamite Guerin (BCG) to prevent tuberculosis; Oral Polio Vaccine (OPV) to prevent poliomyelitis; pentavalent vaccine to prevent diphtheria, pertussis, tetanus, hepatitis B and hemophilus type b influenza meningitis; pneumococcal conjugate vaccine – 13 to prevent pneumonias; rotavirus vaccines to prevent diarrhea due to rotavirus; tetanus toxoids to prevent tetanus; and measles rubella vaccine to prevent measles and rubella diseases [4]. There are increased young women pregnancies in Tanzania and other sub-Saharan Africa, this problem is assumed to be associated with school girl's pregnancies [5]. The National Bureau of Statistics estimates 27% of women begun childbearing at age of 15 to 19 years by 2015, this is 3% increase compared in 2010 data [6]. It is also estimated that, an average of 8,000 girls drop out from the school due to pregnancy every year, and to worsen the situation most of these are abandoned by the men responsible for the pregnancies [7]. On the other hand, the rate of unmarried young women is estimated to be 66% for women aged 20 to 24 years by 2010, this increased from 32% in 2004/05. In this regard, the probability of having pregnancy for the unmarried young women increased from 2004/05 to 2010 based on their sexual behavior [8]. The pre-marital births in Tanzania is estimated to be 18%, and the possibility of ever being a single mother by the age of 45 is 51.7%. The pre-marital births are between 20% and 30% (approximately 25%) by the age 20 to 24 years (the divorce rate by the same age group contributes 10% to 20% of young unmarried women pool [8]. Through using population projections estimates by National Bureau of Statistics (NBS), the infant from unmarried young women are projected to be about 25% of female population aged 20 to 24 years

(2,384,040), reflecting 596,010 infants by 2016 [6,8,9].

Furthermore, according the Tanzania Demographic Health Survey (DHS) 2015, it was shown that, 89% of children aged 12 to 23 months were vaccinated with three doses of DTP containing vaccine [6]. Through using the above thinking-ability and assumptions, Temeke Municipality is estimated to have approximately 11,990 infants of unmarried young women by 2016 and these need immunization services among other basic health needs [9, 10]. Majority of infants of young unmarried women (aged 15 to 24 years) in Temeke Municipality (approximately 11,990 children) are un or under vaccinated with the required vaccines infants routine vaccination schedule [9,10]. These infants are therefore prone to be susceptible for vaccines preventable diseases outbreaks such as measles, pneumonia and diarrhea diseases. The diseases interferes their growth developmental milestones and affect their future development. Furthermore, their mothers will spend more time for seeking medical care and reduce time for engaging in income generating activities. Irrespective of several Government initiatives for reducing early pregnancies and reaching all infants with vaccination using reach every child strategy, yet the problem still exists in urban and sub urban set up like in Temeke Municipality [7, 11]. Therefore, this study assessed factors which if intervened will increase access of young unmarried women to immunization programme services and in turn prevents their infants against VPDs. This study was aiming to assess social factors that hinder accessibility of infants of un-married young women, to immunization programme services in Dar es Salaam. The results obtained from this study are expected to be used by the National Immunization Programme in Tanzania to increase infants' access to vaccination services. Currently the Ministry of Health, Community Development, Gender, Elderly and Children is struggling to implement strategies for increasing access to vaccination services especially to vulnerable groups. Among of the vulnerable groups who are missing health services especially immunization services are the young unmarried women,

### ***1.1 Young Women***

The definition of youth differs in various organizations including the United Nations Organizations. The United Nations (UN), for statistical purposes, defines 'youth', as those persons between the ages of 15 and 24 years, without prejudice to other definitions by Member States [12, 13]. The UN Secretariat is therefore regularly using the terms youth and young people interchangeable to mean age between 15 and 24 years; while the UN-Habitat in the youth fund regards the persons aged 15 to 32 years [12, 13, 14]. A youth is a boy or a girl who is in a transition period from childhood to adulthood. The Tanzania National Youth Development Policy, 1996 recognized the age group of 15 to 24 years; however the revised policy of 2007 recognized up to 35 years as youth [15, 16]. The definitions and policy dilutes the importance of the youth as considered firstly by UN in 1981 and therefore in this, study young women will be regarded to all women aged 15 to 24 years.

### ***1.2 Social Factors***

The Oxford Dictionary defined social as an attribute "relating to society or its organization" or "Needing companionship and therefore best suited to living in communities [17]. The Center of Diseases Control and Prevention (CDC) and WHO described social determinants of health as "The complex, integrated, and overlapping social structures and economic systems that are responsible for most health inequities [18, 19].

These social structures and economic systems are; the social environment, physical environment, health services, and structural and societal factors” [18, 19]. The social determinants of health are the conditions in which people are born, grow, live, work and age. In this study, the social factors regard to personal factors such as age, education level, marital status and caregivers conveniences factors

### ***1.3 Vaccines, vaccination coverage and immunization programme services monitoring***

Vaccines are biological product prepared from killed or attenuated (weakened) virus or bacteria or their toxins, used for vaccinating people to induce specific immunity against an infectious disease [20,21]. In line with the concept, the vaccination coverage refers to the proportion of vaccinated individuals among the target population; while the immunization drop out is defined as a comparison of the number of children who start receiving immunization and the number who do not receive later doses for full immunization [22]. In this study, the plan was to assess the immunization coverage for the infants of young unmarried women.

### ***1.4 The Vaccination Confidence***

The Oxford English Dictionary defines “confidence” as “the mental attitude of trusting in or relying on a person or thing” [17]. The vaccination confidence is regarded as all issues associated with vaccines effectiveness and its safety including the vaccines delivery system. Studies have shown that, the vaccination confidence is continuum and is ranging from 0% to 100% [23]. In the context of vaccination, confidence implies trust in the vaccine (the product), trust in the vaccinator or other health professional (the provider), and trust in those who make the decisions about vaccine provision -the policy-maker [24].

### ***1.5 The Vaccination Complacency***

The Oxford English Dictionary defines ‘complacency’ as “smug or uncritical satisfaction with oneself or one’s achievements’ [17]. The vaccination complacency is regarded by SAGE (2014) as perceived risks of Vaccine Preventable Diseases [23]. Kane (2001) on his measles epidemic report of United States, he explained that, “the nurses arrive with injections to prevent diseases we have never seen; we might narrow our eyes with suspicion” [25]. This situation was regarded as a complacency disease. In this study, complacency refers to the worriedness of young unmarried mothers with infants for the vaccines preventable diseases.

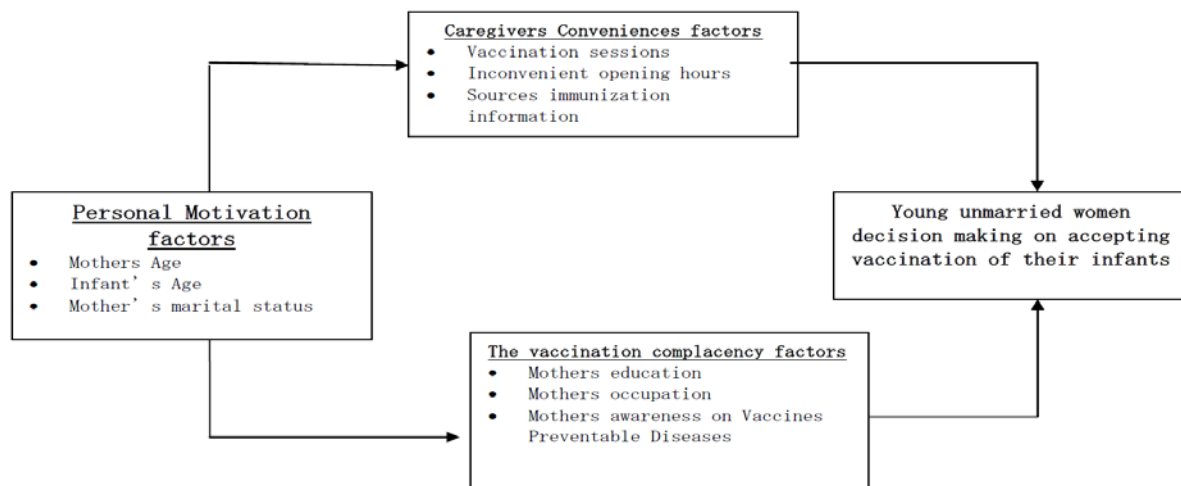
### ***1.6 The Vaccination Convenience***

Convenience is defined by Oxford dictionary as “The state of being able to proceed with something without difficulty’ [17]. The Ministry of Health encouraged that, Immunization Programme services should be run to suit the convenience of customers and not of staff [4]. Furthermore, SAGE (2014) defined vaccination convenience as the state of being able to receive vaccination services with little effort or difficulty [23]. In this study, the SAGE definition was used as a standard definition for Immunization Programme services conveniences.

### ***1.7 Conceptual Framework***

The Scientific Advisory Group of Experts (SAGE), under WHO in 2014 was concerned about the vaccination hesitancy behavior among caregivers. The group conducted critical analysis on the social factors related with the vaccines hesitancy behavior to caregivers and came up with key drivers of vaccination hesitancy namely the confidence, complacency and conveniences [23]. In developed countries, due to the fact that, the vaccination coverage are maintained at higher level, represents markedly reduction of VPDs and therefore the degree of fear to VPDs by the community is very low [24,25]. Complacency is very much linked and related with knowledge and information on VPDs. On the other hand, the hesitancy was also related to conveniences which in this respect are referring to all issues related to vaccines delivery systems (affordable, convenient in time and place and comfortable). In regard to poor access of vaccination services among infants of young unmarried the confidence, complacency and conveniences were very important factors to be investigated.

Source: Adopted from Tailored Immunization Programme (TIP), WHO, 2013 [26]



**Figure 1:** Social Factors Influencing Unmarried Young Women in Immunization Services Decision Making Conceptual Framework

### 1.8 Behaviour Decision Making Theories

The unmarried young women under gone a certain decision making process before agree or disagree in utilizing the available immunization services. Studies have shown that, there are several factors influencing decision making in relation to behavioral decision making theories. Jullisson and his colleagues (2005) indicated that, past decisions has influence in people's future decisions [27]. Using the same sense, the unmarried young women by default of their age and experiences, are at risks of not using the available services disregard to Government efforts in ensuring every child is vaccinated [27,28]. The theories emphasized that, when positive results happened from a decision, people are more likely to decide in a similar way, given a similar situation. Again, emphasizing on past experiences which may had not happened to most of unmarried young women. On the other hand, people tend to avoid repeating past mistakes [29]. The experiences faced by older women for the vaccines preventable diseases fatalities could be the source of their behavior change to accept the available immunization programme services differently to what is practiced by young unmarried women in Tanzania and

more specifically Temeke Municipality. This thinking ability corresponds to behavioral decision making comparison model where the effects of decision depends much on perceived risk, probability of a loss and importance of a loss [27,30]. Linking immunization decision making and utilization of the immunization programme services, SAGE (2014) came up with the three scenarios of confidence, complacency and conveniences [23,30]. The confidences which can be built to unmarried young women to immunization services depends on whether, they are well informed on the at least five communication key immunization key message prior and after visiting the health facilities. The WHO emphasized on communication to achieve vaccination coverage in hard-to-reach populations (in this regard the infants of unmarried young women) and to build trust in vaccines among those who question them [31]. Immunization services cannot be differentiated from other provider – client interactions. The process of receiving vaccination needs the client to undergone decision making process which could be similar in those consumers in retail market. Engel and his colleagues (1968) developed a model of consumer buying decision process in five steps: Problem/need recognition, information search, evaluation of alternatives to meet this need, purchase decision and post-purchase behavior [32]. This study, therefore assessed if the unmarried young women were aware on the vaccine preventable disease burden and how they searched immunization programme services information

### ***1.9 Empirical Literature Review***

In 1974, when WHO introduced EPI the target was to reach all children under one year with 4 types of vaccines, namely BCG, DTP, measles and polio vaccines. The coverage by that time was only 5%, however currently the global vaccine coverage had increased to 85% by 2014 for the 4 initial vaccines and more new vaccines were introduced depends on the countries preferences and economy [33, 34]. However, with this tremendously achievement, the WHO African region remained the least in vaccination coverage performance by having 77% of DTP third dose while Western Pacific WHO region is at 96 % [33, 34] A third dose of DTP containing vaccination coverage as a proxy indicator for measuring immunization programme services performances and is a major basic health indicator [35]. Tanzania has been performing well in immunization programme services in comparability of other African countries; and the DTP containing vaccine third dose stands at 97% by 2015 [4].

Nevertheless of the global, regional and country achievement, challenges exist in the delivery of vaccines. Major immunization programme services challenge remained to be stock out of vaccines at different storage levels of the vaccine supply chain [4, 33, 34]. In additional, financial resources constraints, insecurity and geographical barriers in hard to reach areas are among of bottlenecks for the immunization programme services to reach every target population [4, 35]. The impact of vaccination is regarded to go beyond the number of children immunized based on the fact that, it reduces the risks for the community to be infected by VPDs through herd community and reduction of house hold expenditures to take care for sick children [36]. Vaccines are therefore very important in enhancing cognitive development of children, their health and economic life. In this regard, immunization is not a merely global public expenditure rather than global investment which will yield 18% of its investment by 2020 [37]. The general program policies, including this EPI goal were adopted globally in May 1977 and approved in the World Health Assembly Resolution-WHA30.53. EPI was prioritized among of the health programmes and a special strategy of Universal Childhood Immunization (UCI), was implemented from 1978 to 1984, this raised the vaccination coverage from less than 25% to over 80%; in line

with reduction of VPDs [1]. Majority of poor and middle income population are likely to concentrate in lower level of care (dispensaries and health centers) compared to upper tiers who are likely to receive care at Hospital [38]. The young unmarried mothers are likely to fall in that category of poor and middle income population, based on the fact that, they often faced health, financial and socio-economic challenges before the pregnancy, during the pregnancy and after giving births [5]. Nevertheless, Temeke Municipality is having more private health facilities than public facilities and therefore accessibility to health services may be a problem for unmarried young women [10]. Comparative cohort and cross-sectional studies in sub-saharan Africa suggested that, providers in the private sector more frequently violated medical standards of practice and had poorer patient outcomes, this experience cannot be excluded in Temeke Municipality [39]. The above mentioned reasoning and evidences indicates that, these infants born by the unmarried young women and especially in rural areas are socially and psychologically deprived when compared to similar infants of married young women [40].

#### ***1.10 Personal Motivation Factors Influences to Decision Making In Accessing Immunization Programme Services***

This section reviewed literatures with positive and negative effects of personal motivation factors in vaccination decision making. The personal motivation factors as shown in figure 2.3 are the mother's age, infant's age and mother's marital status.

##### ***1.10.1 Mothers (Caregivers) Age Influences to Decision Making in Accessing Immunization Programme Services***

The United Nations [5, 13] regards the youth are people between 15 and 24 years of age, this age group is estimated by the National Bureau of Statistics to contribute about 18% of the total population. Furthermore, the Tanzania Demographic Health Survey, about 56% of all women became mothers by age of 20 and most of these are in rural areas compared to Urban; and the mean marriage age for women was 19.2 years [8, 41]. It is estimated that, almost 27% of these young women became mothers and therefore their infants will need vaccination services [41]. Study in Italy conducted by Angelillo (1999), indicated that, the level of knowledge about mandatory vaccinations for infants correlated significantly with the mother's age (that is, not being a teenage mother) with odds ratio of 1.03 (0.99±1.07) [42]. It is therefore concluded that, young women aged 15 to 24 years are less likely to seek for immunization services for their infants when compared to older age groups. Another study in Malawi conducted by Mvula and his colleagues (2016) shows that, the predictions of infants of mothers aged less than 20 years as independent criteria to get vaccination in campaign is higher at a value of 75% compared to other older age groups ranging 38.5% (for more than 40 years ) to 71.6 % (for mothers aged 20 to 29 years) [43]. However, the lower the age the less likelihood of benefitting from other factors like education and socioeconomic factors which had great impact in decision making.

##### ***1.10.2 The Infant's Age Influences to Decision Making in Accessing Immunization Programme Services***

The age of children has been shown to have effect in the mother's decision making for taking her child for vaccination services. In the study conducted by Oliveira and his colleagues (2014) in Luanda to find out that,

the percentage of vaccinated children under 1 year of age corresponded to approximately 1.8 times the rate for children over 1 year of age [44]. The study conducted by Mvula and his colleagues (2016) in Malawi, indicated that under 6 months aged children were likely to be vaccinated compared to other age groups infants. In that study, under 6 months were the highest score of 86% predicted group to be vaccinated, while 10 to 12 months scored only 27.2% prediction value to be vaccinated in campaign [43]. Another study conducted by Tagbo (2014) in Nigeria indicated that, infants aged between 10 – 15 months are more likely to be vaccinated 1.5 to 2 folds compared to older age infants [45]. This can be due to several factors; some think that, mothers of young infants always need second opinions of their infants rather than the vaccination need. This was thought not to be excluded while conducting study of unmarried young women in Temeke Municipality.

#### ***1.10.3 Marital Status Influences to Decision Making In Accessing Immunization Programme Services***

There are evidences that, marital status had an effect on the decision making for the mother to send her child for vaccination services. Study conducted by Brugha (1996) in Ghana indicates that, fathers were more likely than mothers to perceive and participated in the decision to send children for immunizations. In this study, married women were enforced by their husband to use of preventive health services [46]. In this regard, married women have the potential to increase timely immunization coverage levels (Brugha and his colleagues 1996) when compared to unmarried women [40]. These findings are contradicting with the findings from a case control study in Brazil conducted by Logullo and his colleagues (2008), where marital status was shown to have no effect with measles vaccines uptake to infants [47]. The variability in the findings from the two studies could be contributed by the sociocultural differences.

#### ***1.11 Immunization Complacency Factors Influences to Decision Making in Accessing Immunization Programme Services***

The complacency factors have major role for the mother to decide to take her child for the vaccination services. This sub section will review studies which had shown the effect of mother's education, mother's awareness and mother's occupation in making decision to take her infant for the vaccination services.

##### ***1.11.1 Mother's Education Influences to Decision Making in Accessing Immunization Programme Services***

Several studies have shown the linkage of mother's education, access to information media, health care utilization, age and occupation of mothers with the access to vaccination services. The National Bureau of Statistics indicates that 52.3% of young mothers (aged 15 to 19 years) have no formal education and 33.8% have primary level education while only 10.4% have secondary or higher level education [41]. Study in Uganda indicates that, Children whose mothers had post-secondary education were twice as likely to be fully immunized compared to their counterparts whose mothers had only primary education [48]. In that study, Children whose mothers had at least primary education increased the probability of being fully immunized by 8-14%, whereas Children whose mothers had at least secondary education were 6-7% more likely to receive the three doses of DTP and polio vaccines compared to the counterparts having mothers with no education [48]. A similar study in rural Bangladesh indicates that, the effect of mother's ability to visit health centre alone was also dependent on

ownership of radio, economic condition of household, and mother's education [49]. These two studies showed the importance of mother's education in making decision for her child health including immunization services. Furthermore, sources of information based on the socioeconomic status plays a role in improving mother's decision making for accessing immunization services. In this study, all these factors were assessed to unmarried young women.

#### ***1.11.2 Mother's Occupation Influences to Decision Making in Accessing Immunization Programme Services***

The mother's occupation has a greater role on the decision making for her child vaccination. The study conducted Bofarraj (2011) in Libya indicated that, 88.2% of the children completed their vaccination status their mothers were house wife compared to 79.5% of infants whose mothers were employed [50]. However, 21.9% of children of employed mothers had incomplete vaccination compared to 11.8 of house wife. In contrast with this finding, a study conducted by Tagbo (2014) in Urban district of Nigeria, which concluded that Mothers that are working; particularly the Government employed are more likely to complete immunization for their children compared to house wives and business women [45].

#### ***1.11.3 Mothers Awareness of Vaccines Preventable Diseases Influences to Decision Making in Accessing Immunization Programme Services***

Increased knowledge of the immunologic factors of disease led to new vaccines being developed and added to the EPI's list of recommended vaccines in Tanzania including; Hepatitis B (HepB) in 2002; Haemophilus influenza meningitis (Hib) in 2009; Pneumococcal Conjugate Vaccines -13 (PCV-13) in 2013; Rotavirus vaccine in 2013; Measles Second Dose in 2014 and Measles Rubella in 2014. These efforts of introducing new and under used vaccines are always conducted simultaneously with increasing awareness to caregivers on the importance of vaccines and vaccines preventable diseases. A study in Urban districts of Nigeria indicated that, over 33.3% of infants who were not vaccinated, their mothers were not informed on the vaccines, its benefits and vaccines safety [45]. Mother's awareness on the benefits of vaccines remains to be important in making decision for whether accepting their children to be vaccinated or not. A similar study conducted earlier in Burkina Faso showed that, mothers who had been exposed to a variety of interpersonal and media messages were more likely to know the requirements to complete vaccination schedule and know the dates for specific vaccines than mothers in the control group [51]. These findings are similar to other shown by Perez-Cuevas (1999), where the net increase in level of use of immunization services between the unaware and aware groups of Mexican mothers was 14.8% [52].

#### ***1.12 Immunization Conveniences Influences to Decision Making in Accessing Immunization Programme Services***

Majority of young unmarried women like other caregivers are engaged on daily income generating activities and this is more important for young unmarried women. Any interference on the convenient time and place for vaccination can alter their decision for whether to take their infants for vaccination or not. In situation where health facilities are not having vaccines regularly or delayed vaccination sessions, some caregivers can opt not

to take their infants for vaccination. A National Immunization Survey (NIS) in United States indicated that of the 11,206 sampled children aged 24 to 35 months, 10.9% of their mothers refused to be vaccinated and 15.9% had delayed vaccination because of conveniences [53].

#### ***1.12.1 Vaccines Availability Influences to Decision Making in Accessing Immunization Programme Services***

The regular availability of all vaccines is important for the caregivers to make appropriate decision for taking their children for the vaccination services. The WHO conducted analysis of missed opportunities and realized that, approximately 44% of un and under vaccinated children were due to immunization system problems including unavailability of vaccines regularly in clinics [54]. A review of 79 studies on missed opportunities were identified from 45 countries indicated that, 10% (1 -24%) for 11 studies, vaccines unavailability was found to be the major problem [55].

#### ***1.12.2 Vaccination Sessions Influences to Decision Making in Accessing Immunization Programme Services***

The frequency of immunization sessions had been shown to have effect on influencing mothers to access or not the immunization programme services. The studies in Burkina Fasso indicated that, measles vaccination coverage (provided twice per week to once monthly) was 80% low when compared to penta vaccination coverage (provided daily on working days) when provided in fixed sessions [56]. This coverage variation experiences were also observed in reports from different councils in Tanzania where MR vaccines are given once weekly while penta vaccine was given daily [4]. The WHO in addressing priority transformative immunization services prioritization, recommends health workers to provide all vaccines in vaccination sessions as a strategy to reduce the immunization services dropout rates [34]

#### ***1.12.3 Vaccination Opening Hours Influences to Decision Making in Accessing Immunization Programme Services***

In urban areas, most women engaged in income generating activities, this interfered their availability in taking their children for immunization programme services especially when the opening hours is not convenient with their jobs. A study in urban slums of Bangladesh showed that, extending working hours of immunization session from 4 hours (10.00 pm - 02.00pm) to 7 hours (10.00pm – 05.00pm) contributed to increased fully immunized children from 43% to 99% [57]. Another study conducted by Amin and his colleagues (2013) in urban Dili, Timor-Leste indicated that, 3 % of mothers were not satisfied with immunization Programme services because of prolonged waiting hours (more than 30 minutes) [58]. These innovative ideas can be implemented in Tanzania to reduce the missed opportunities and increase the vaccination coverage especially in urban and sub urban areas.

#### ***1.12.4 Sources of Immunization Information Influences to Decision Making in Accessing Immunization Programme Services***

A systematic review of the of 202 peer-reviewed articles for 10 years (1999 to 2009) to find out factors related to the under-vaccination and non-vaccination of children in low and middle income countries; find outs that 5%

of under vaccination is due to communication and information using the wrong sources [59]. In some occasions, radio and television spots are aired in time while most mothers are engaging in income generating activities and therefore cannot receive the messages. The similar findings were shown by Amin and his colleagues (2013) in urban Dili, Timor-Leste where 11% of mothers attending vaccination session were observed not to be given dates for next session and 19% of the mothers did not remember the dates for next clinic on the exit interview [58].

### ***1.13 Immunization Programme Policy Reviews In Relation with Immunization Programme Services***

#### ***1.13.1 The National Health Policy, 2007***

The immunization programme services in Tanzania are described in the basic health care under the essential health care package of the Tanzania National Health Policy (NHP) in reproductive health services [60]. The policy is indicating that, the immunization programme services should be given free of charge in both public and private facilities. It further indicates that, the Government with immunization stakeholders is responsible to ensure regular availability of vaccines and related supplies throughout the country. In line with the policy, MOHSW had increased the allocation in reproductive and child health sub account (where immunization programme services belongs) from 10.7 % of Total Health Expenditure (THE) in 2004/05 to 17.9% of THE in 2009/10 [61]. The unmarried young women in the NHP are expected to receive care at the community level using the community health care workers and in the primary health care in the essential health care package.

#### ***1.13.2 The Public Health Act, 2009***

Immunization programme services are featured in Part III of the Public Health Act, 2009 “Notification of Infectious or Communicable and Non-Communicable Diseases and Isolation of Infected Person” in sub section addressing vaccination against childhood and other infectious diseases [62]. The act indicates that, caregivers should ensure their children are vaccinated according to the national immunization programme schedule. The act address the children in schools should be enrolled after presenting their vaccination cards showing complete vaccination. If this will be implemented will increase the coverage of vaccination however in a non-user friendly care as recommend by WHO [23]. Furthermore in item 24(2) of the Public Health Act, 2009, it is well stipulated that, it is an offense if a mother refuses her to be vaccinated [62]. The unmarried young women are therefore expected to be well informed and adhere to the act.

#### ***1.13.3 The National Immunization Programme Vaccination Policy***

The overall goal of immunization programme in Tanzania is to contribute in the reduction of infant’s mortality and morbidity towards delivering of quality vaccines in routine and campaign delivery modes [4, 60]. The routine immunization programme services are either delivered in fixed posts as part of the reproductive and child health services or in temporary outreach services or hard to reach. On the other hand the campaign delivery mode is given to supplement the children missed in routine vaccination. The children vaccines are given to under two years children according to the primary immunization schedule adopted from WHO recommended schedule for infants [33]. In order to address the missed opportunities including those of young

unmarried women, WHO recommends screening of all infants when attending health facilities for any medical services [33, 34]. Furthermore, increased awareness through addressing community barriers had shown to reduce missed opportunities and increased access and utilization of immunization programme services [23, 34].

## **2. Materials and methods**

This study was conducted in Temeke Municipality in Dar es salaam City. Temeke Municipality is the second largest Municipality in Dar es salaam. Temeke Municipality has an area of 684 square kilometres representing 49% of the total area of Dar es salaam City. The Municipality had also the highest inter-censal growth rate of 5.6 % between the 2002 and 2012 census [9,10] and has high dependency ratio of 55 and 47 when compared with other Dar es salaam municipalities [9]. The health system in Temeke Municipality is built mainly for curative services, mostly of which are concentrated in urban wards, rural wards have few facilities and therefore have no geographical equity and access of basic health services such as immunization. Out of the 123 health facilities in Temeke Municipality, approximately 60% (74 health facilities) provide immunization services. The Municipality is further divided into 24 wards of which some are in rural areas and others city centre of Dar es salaam City [10]. The vaccination delivery in Temeke Municipality is primarily through 74 fixed (static) vaccination posts and 34 monthly outreach services of which 2 are delivered as mobile vaccination services. The vaccination coverage (using a third dose of DTP as a proxy indicator ) over the past three years has been declining from over 100% in 2013 to less than 80% by 2015 in contrary with the national average of vaccination coverage which increased from 92% (2013) to 97% in 2015 [4]. In this regard, the infants of unmarried young women are likely to miss the primary vaccination and become vulnerable for vaccines preventable diseases.

### **2.1 Study Design**

Descriptive retrospective case control study design was deployed, to collect information about vaccination status of infants of unmarried young women in Temeke Municipality for the calendar period of 1 years (ranging from May, 2015 to May 2016). The selection of this research design was based on its nature, scope and object enquiry, availability of resources, time factor and precision required [9, 10, 63, 64].

### **2.2 Sampling Techniques**

A multi stage sampling procedure was used in this study. The initial process was listing of all health facilities in Temeke which provides basic health services, including immunization programme services and delivery. A total of 83 registered health facilities were identified from which there were 6 hospitals, 9 health centers and 68 dispensaries. Hospitals and Health centers were purposefully chosen based on the fact that, many deliveries were assisted in hospitals and health centers. Furthermore, all hospitals and health centers were ranked based on the 2015 deliveries data obtained in Temeke Municipality Council Health Plan [10, 63]. Only the top two hospitals and one health center were chosen, and these were Temeke Municipal Hospital, Mbagala Rangitatu Hospital and Kigamboni Health Center. Active search was conducted in the labor ward registers, and line list of unmarried young women was obtained for the period of May, 2015 to May 2016. The line list included the address, phone numbers and the referred clinic for future vaccination after delivery.

A total of 734 names of unmarried young women were listed and a randomly selection was done by picking an odd number of name from the list. Furthermore, 12 trained nurses and 2 health officers were deployed in the tracking of the listed young women in two weeks period after orientation of data collection. Finally, 214 unmarried young were enrolled and were interviewed.

### ***2.3 In-depth interviews to Health Workers from the Selected Health Facilities***

The sampling frame of 68 dispensaries providing immunization services was used to select 14 dispensaries randomly. In these dispensaries, an open ended in-depth interview was administered by the designated health officer with immunization services background knowledge to any nurse found in the immunization clinic at the time of visit. In this regard, 14 nurses were interviewed and their information were analyzed and used to complement the quantitative data. In additional, the health officer verified the information gathered using the structured observation checklist of immunization services.

### ***2.4 Sample Size***

The sample of 192 young women was included in this study. This sample size was obtained by assuming a confidence interval (CI) of 5% (will plus or minus 5%), the Standard Error (SE) of 2.55 which was the results after dividing the confidence interval by a factor of 1.96 [64]. The sample size (N) was calculated using this following formula;

$$N = \frac{P (100\% - P)}{(SE)^2}$$

Where P represent the estimated percentage and SE stands for the standard error (Fox and his colleagues 2007).  $N = 86.1(100-86.1)$  divided by 2.5 squared, which is resulting to 191.4864 approximately 192 unmarried young women.

### ***2.5 Data Collection Methods***

The word “Data collection” refers to the gathering of information to serve or prove some facts [63]. For the purpose of this study several tools were employed in order to capture information about the factors which hinders accessibility of immunization services or the infants of young unmarried women. According to Kothari (2013) primary data are those data which are collected the first time, and thus happen to be original in charter. Primary data from this study were the information which were gathered directly from respondents through questionnaires, ``observation and interviews. Secondary data were those data which were already collected by someone else and were involving a review of published material and information from internal sources [63, 65].

### ***2.6 Primary Data***

The primary data were collected using semi-structure interview using the questionnaire, structured observation checklist and in-depth interview checklist. The initial English version of semi structured questionnaires,

interview checklist and structured observational checklist were translated into Kiswahili. These questionnaires were piloted to 10 caregivers in a health facility in Kinondoni Municipality to make sure that the questionnaire generated the right responses. The concerns and suggestions obtained from the pilot were used in the final refinery of data collection tools prior to be used in the actual study. In this study, one health workers with experiences in immunization programme services among the research assistants was guided to conduct observation of the interactions in health facilities between the young unmarried women in the selected 14 health facilities. These observations were documented and summarized as part of the in-depth interviews findings. The team of 14 research assistants were selected and trained oriented on the questionnaire, structured observation checklist and in-depth checklist for one day before actual data collection. The research assistants were 12 qualified nurses or 2 health officers who had background experiences on the immunization services. The research assistants were deployed for two weeks each to track at least 20 young women in the provided list and they all conducted the interview as instructed. Quality assurance was conducted by verifying 20 filled questionnaires which were randomly picked by the principal investigator. The in-depth interview was conducted to 20% of the dispensaries in Temeke Municipality, and these 14 health facilities were randomly selected from 68 dispensaries providing vaccination services. This was based on the time constraint and insufficient resources to conduct in all 68 dispensaries in the Municipality and they are therefore not providing generalized information. The health officer who conducted the interview was guided to ask consent before discussion, recorded the interview. After interview, the transcriptions were conducted by the principal investigator and the research assistant and information was analyzed qualitatively.

## **2.7 Secondary Data**

Secondary data of administrative routine vaccination data from Temeke Municipality was used in fine-tuning the study background information. These data were also collected from the children vaccination registers of the sampled health facilities, the vaccines ledger books, monthly vaccination reports and health facilities performance monitoring charts. Furthermore, the vaccination coverage survey data conducted by Ifakara Health Research Institute, National Bureau of Statistics or any reputable United National organization were used supplement the field research findings.

## **2.8 Analysis and Results**

The collected data was analyzed qualitatively and quantitatively to provide information and descriptions necessary for making up recommendations and conclusions. The data collected through quantitative methods were entered into an access database (interfaced by Epi Info (TM) 3.5.4). The database was developed to correspond with the study questionnaire. The data was cleaned for quality control purposes and analyzed through Epi Info statistical package. Descriptive analyses were conducted to describe different characteristics of the study participants. Categorical variables were described in terms of frequencies and percentages and presented in tables and figures. The Chi-square test was used to establish the relationship between timely vaccination and social factors by comparing the proportions between levels of the explanatory variables. The social factors assessed were mother's age, education, and occupation, awareness of VPDs and source of information. They were all tested, and for the p-values of less than 0.05 obtained from the Chi-square, the

association/relationship was rejected.

### 3. Results

A total of 214 young mothers were interviewed, of which 196 were young unmarried women with infants and therefore the response rate was 102 % of the target of 192 young unmarried women with infants. The age of the respondents range from 13 to 25 years, mean age was 19 years and median age group was 18 to 25 years (49.1%). Table 3.1 indicates that, 97.2 % of the respondents were at the age between 15 years to 25 years at the time of study. In this study, 2.8% (6 mothers) were below 15 years and they were impregnated before completing the primary school. In other words these did not even completed the primary school by that age, and therefore a situation where a child is having a child of her own similar to previous study findings in Tanzania [7]. Some suggestions have been made by Government and Non-Government Organization including establishing of open dialogues with community members, parents, students and teachers; establishment of student anti pregnancy clubs; increased access of contraceptives to adolescents and promotes legal and policy framework for girls education in Tanzania. However, translation of these theories into real practice had not yet happened or materialized, and the youth pregnancies had increased to 27% in 2015 from 24% in 2010 [9].

**Table 1:** The Distribution of the Respondents by Their Age Groups (n =214)

Mothers Age (in years)	Number	Percentage (%)
Under 15	6	2.8
15-18	103	48.1
18-25	105	49.1
25+	0	0
<b>Total</b>	<b>214</b>	<b>100</b>

Source: Field Data (2016)

#### 3.1 Children's Age

In this study, it was realized that, most of the study participants (32.7 %) had children aged 1 to 3 months (table 3.2), followed by 18.5 % who had children aged 10 to 12 months and the least were women with children aged less than 1 month (11.8 %). Three children had no written evidences of their exact age at the time of interview.

In this study 62.5% of children were aged less than 6 months, which is similar findings from previously two studies in Luanda, Malawi and Nigeria where many infants were vaccinated compared to over one year children [43, 44, 45]. In Luanda and Nigeria infants were vaccinated between 1.5 to 2 folds compared to over one while in Malawi under 6 months were the highest score of 86% predicted group to be vaccinated, while 10 to 12 months scored only 27.2% prediction value to be vaccinated in campaign age [43,44,45]. In this regard, the age of children has been shown to have effect in the mother's decision making for taking her child for vaccination services.

### 3.2 Marital Status

In terms of marital status, a good proportional of study participants were found to be single unmarried (91.6%) as shown in table 3.3.

However, 8 (3.7%) were single after being married and divorced; and 10 (4.7%) were married but their spouse died by that age of under 25 years. Furthermore, 34.2 % of the women interviewed reported to have more than one child by that age, indicating low contraceptive uptake for the unmarried young women and there is a need to investigate and intervene.

**Table 2:** The Distribution of the Respondents by Their Children's Age Groups (n =214)

Children's Age	Number	Percentage (%)	Valid (%)
Below 1 month	25	11.7	11.8
1 to 3 months	69	32.2	32.7
4 to 6 months	38	17.8	18.0
7 to 9 months	29	13.6	13.7
10 to 12 months	39	18.2	18.5
Above 12 months	11	5.1	5.2
Data not available	3	1.4	0
Total	214	100	100

Source: Field Data (2016)

**Table 3:** The distribution of the respondents by their marital status (n =214).

Marital status	Number	Percentage (%)
Single	196	91.6
Married	0	0.0
Divorced	8	3.7
Widowed	10	4.7
<b>Total</b>	<b>214</b>	<b>100</b>

Source: Field Data (2016)

### 3.3 Education Level

In this study, it was understood that, majority of studied young women, 47.7 % completed primary education and 19.6 % completed secondary education as shown in table in table 3.4. More than one in five young women (22.4%) did not complete primary and secondary education because of being impregnated while in school.

This is also a serious public health and education sector problem which needs to be investigated and intervened.

**Table 4:** The Distribution of the Respondents by Their Level of Education (n =214)

Education level	Number	Percentage (%)
No formal education	13	6.1
Primary, but not completed	29	13.6
Primary, completed	102	47.7
Secondary, but not completed	19	8.9
Secondary, completed	42	19.6
Tertiary	9	4.2
<b>Total</b>	<b>214</b>	<b>100.0</b>

Source: Field Data (2016)

### 3.4 Occupation

In this study, it was founded out that, most of the participants were un-employed (40.2 %) and 35.1 % were doing unskilled jobs (such as petty business women in streets) as shown below in table 3.5. Professional jobs by that age were for 7 (3.3%) and both manual skilled and non-skilled were few 1.4% and 0.5% respectively. This is also an important factor especially when plans for vaccination sessions are prepared should consider the conveniences of this important group.

**Table 5:** The Distribution of the Respondents by Their Occupation (n =214)

Occupation	Number	Percentage (%)
Unemployed	86	40.2
Student	5	2.3
Unskilled jobs	75	35.0
Partially skilled	22	10.3
Manual skilled	3	1.4
Manual non skilled	1	0.5
Professional	7	3.3
Others	15	7.0
<b>Total</b>	<b>214</b>	<b>100.0</b>

Source: Field Data (2016)

### 3.5 Ownership of Mobile Phone

In this study, it was found out that almost 7 out of 10 interviewed young women own her mobile phone (74.8 %) as shown in table 3.6. This is more than the National average of 57% obtained by NBS in the house hold budget

survey [66]. The fact that, majority of young women are owning mobile phones should not be underscored, it can be used as an opportunity to improve their access to health services including immunization programme services. The national immunization programme can explore messaging immunization and other important health information by taking advantages of being used by the young women and the increased network connectivity in the country.

### 3.6 Ownership of Bed

In this study, it was observed that, only 78 % own bed of their own leaving 22 % who weren't able to afford to own a bed as shown below in table 3.6. This is indicating difficult living condition for these unmarried young women with their infants, indicating high rate of basic needs poverty more than the rate of 4.2 averaged to Dar es Salaam [66]. This can be linked with possibility of being having more than one child within the young age (34.2% had more than one child). This finding, call further investigation and intervention including, the girl's education policy and empowerment strategies in Tanzania. Reside in household connected to grid electricity and had a working television and radio. It was observed that, only 45.3% of these young unmarried women were living in household connected with grid electricity as shown in table 4.2.8. This is very low compared to 68% which was obtained by NBS in house hold budget survey for Dar es Salaam [66]. Furthermore, majority were found to get information through radio (59.8%) compared to few (32.2%) who had access to television in the house hold they are living. This is very important in making decision of which media to be used in conveying immunization programme services and other health information.

**Table 6:** Distribution of Respondents According To Ownership of Mobile Phones and Household Appliances (n=196)

Owning equipment or service available	Yes		NO		Total	
	Number	%	Number	%	Number	%
Ownership of mobile phones	160	74.8	54	25.2	214	100.0
Ownership of bed	167	78.0	47	22.0	214	100.0
Live in household with electricity	97	45.3	117	54.7	214	100.0
Live in household with working television	69	32.2	145	67.8	214	100.0
Live in household with working radio	128	59.8	86	40.2	214	100.0
Live in household with working refrigerator	68	31.8	146	68.2	214	100.0

Source: Field Data (2016)

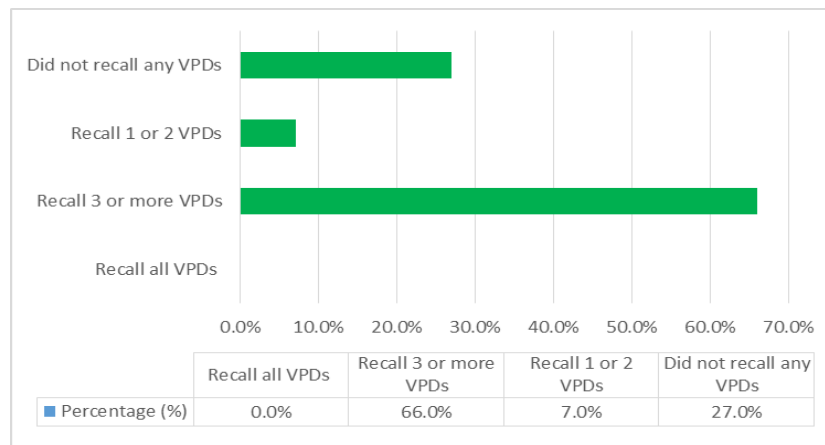
### 3.7 Results of Objectives

#### 3.7.1 The Knowledge of Immunization Programme Services among Unmarried Young Women with Infants

In this study, caregiver's memory to recall VPDs was used as a proxy measure for their knowledge of immunization services programme. It was found that, 66% of the interviewed young mothers with infants as shown in figure 3.7.1 were able to recall 3 or more types of VPDs at the time of the interview and 7% of young

women interviewed recalled 1 or 2 types of VPDs. It was realized that, almost 1 out of 3 women interviewed (27%) do not know any VPDs and therefore were sending their children blindly for immunization programme services without knowing what diseases are prevented by the vaccines received in the vaccination clinics. Information is very important in making appropriate decision and especially in situation like immunization services where the infants are not sick.

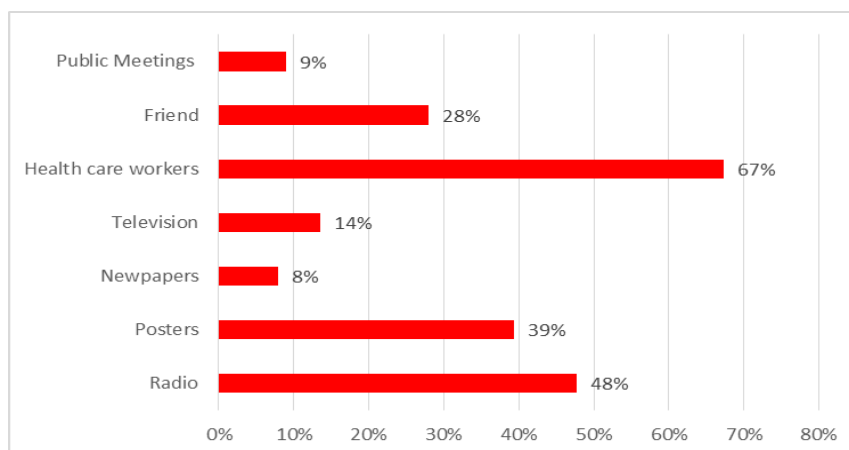
Source: Field Data (2016)



**Figure 2:** Distribution of Unmarried Young Women with Infants According To Their Ability to VPDs (n=196).

### 3.7.2 Main Sources of Immunization Programme Information among Unmarried Young Women with Infants

In this study, young unmarried women with infants were asked to mention the main sources of information for where they got the immunization programme information. The respondents were allowed to mention more than one source, and in this regard majority as shown in figure 3.7.2 mentioned health workers (67.3% of the total interviewed), followed by radio spots (47.7 %) and posters (39.3%). The least sources of information for immunization programme identified were the newspapers (8 %) and public meetings (9 %).

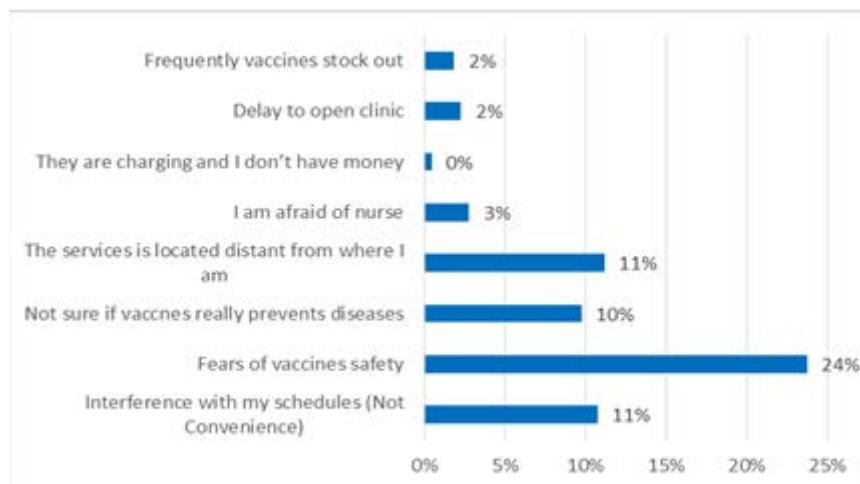


**Figure 3:** Distribution of Unmarried Young Women with Infants According To Their Main Sources of

## Information for EPI Services, (n=196)

### 3.7.3 The Social Factors That Hinders Unmarried Young Women to Access and Use the Immunization Programme Services

In this study social factors were found to limit the accessibility of young unmarried women with infants to immunization programme services especially vaccination services. Out of the 196 young unmarried women with infants, only 120 (61.2 %) had access to immunization programme services and their children were vaccinated in certain period of time. Furthermore, of these 120, only 84 (71.7%) had timely access to immunization programme services and their children got timely vaccination. Figure 3.7.3 below is indicating that, most of the young unmarried women interviewed were not taking their children for vaccination services because were afraid of the vaccines safety (24 %) and 10 % were not sure that vaccines prevents diseases and hence make 1 in every 3 women not vaccinated because of being not well informed. These findings are similar to results in the study conducted in Nigeria, were 33.3% of infants who were not vaccinated, their mothers were not informed on the vaccines, its benefits and vaccines safety [45]. Furthermore, geographical barriers in terms of distance from the health facilities providing vaccination services seemed to be the reasons for not accessing the services for 11 % of non-compliance young unmarried women with infants. The best option for reducing this is providing outreach services in areas without health facilities.



**Figure 4:** Distribution of Unmarried Young Women with Infants According To Barriers That Hinder Them to Access EPI Services, (n=196) Source: Field Data (2016)

In this study, further investigation was done to find out what social factors which had influenced the 120 young women to make decision for their children to be vaccinated.

### 3.7.4 Mothers (Caregivers) Age Influences to Decision Making in Accessing Immunization Programme Services

In this study it was realized that, 84.2 % of mothers aged between 15 to 18 years had timely vaccination for their children (Table 3.7.4). The women aged under 15 years and 18 to 25 years scored 60 % and 60.3 % respectively. Nevertheless, of the high percentage change (24 %), the results shows no statistical significant difference between the timely vaccination and the mothers age group ( $p = 0.015$ ).

**Table 7:** The Relationship between the Age Group of Young Unmarried Mothers with Infants and the Timely Infants Vaccination (n=120)

Mothers age in years	Total (%)	Timely infant's vaccination (%)	$\chi^2$ (p-value)
Under 15	5 (4.2)	3 (60.0)	8.41 (0.015)
15-18	57 (47.5)	48 (84.2)	
18-25	58 (48.3)	35 (60.3)	

Source: Field Data (2016)

### 3.7.5 Mother's Education Influences to Decision Making in Accessing Immunization Programme Services

In the table 3.7.5 below, it is indicated that young mothers with education more than secondary school (tertiary) level all had timely vaccination while only 55.6 % of young mothers completed secondary school had timely vaccination to their children. The young mothers with no formal education had more score compared to those who completed secondary education by 6.9 % change of the scores. Not surprisingly, 82.4 % of young women who did not complete primary school took their children to immunization clinics timely. Nevertheless, in overall there is statistical significance difference between the education level and the timely vaccination in Temeke Municipality ( $p = 0.293$ ).

**Table 8:** The Relationship between the Young Unmarried Mothers with Infants Education Level and the Timely Infants Vaccination (n=120)

Mother's Education level	Total (%)	Timely infants vaccination	$\chi^2$ (p-value)
No formal education	8 (6.7)	5 (62.5)	6.14 (0.293)
Primary, but not completed	17 (14.2)	14 (82.4)	
Primary, completed	52 (43.3)	39 (75.0)	
Secondary, but not completed	14 (11.7)	11 (78.6)	
Secondary, completed	27 (22.5)	15 (55.6)	
Tertiary	2 (1.7)	2 (100.0)	

Source; Field data (2016)

### 3.7.6 Mother's Occupation Influences to Decision Making in Accessing Immunization Programme Services

In this study, it was shown that, young unmarried mothers with infants who were doing partially skilled or unskilled jobs were unlikely to take their children timely for vaccination services (table 3.7.6). Professional

women, manual skilled and unskilled and students took their children timely for the vaccination services. The findings from the study indicates there is significance different between the mothers occupation and timely vaccination (p value = 0.487).

**Table 9:** The Relationship between the Young Unmarried Mothers with Infants Occupation's And the Timely Infants Vaccination (n=120)

Mothers Occupation	Total (%)	Timely infants vaccination	$\chi^2$ (p-value)
Unemployed	56 (47.5)	41 (73.2)	0.48 (0.487)
Student	3 (2.5)	3 (100.0)	
Unskilled jobs	41 (34.7)	26 (63.4)	
Partially skilled	13 (11.0)	9 (69.2)	
Manual skilled	2 (1.7)	2 (100.0)	
Manual non skilled	1 (0.8)	1 (100.0)	
Professional	2 (1.7)	2 (100.0)	

Source: Field Data (2016)

### 3.7.7 Mothers Awareness of Vaccines Preventable Diseases Influences to Decision Making in Accessing Immunization Programme Services

In this study it was found out that, 67.5% of young mothers were able to recall VPDs however, 74.4 % who failed to recall on the VPDs managed to send their children for timely vaccination (4.4 % ahead of those who were able to recall VPDs). Even though, there is significance different (p value =0.650), this suggest that young women are more driven by multiples social factors for accessing immunization programme services including knowledge on VPDs.

**Table 10:** The Relationship between the Young Unmarried Mothers with Infants Awareness on VPDS and the Timely Infant Vaccination (n=120)

Mothers awareness on VPDs	Total (%)	Timely infants vaccination	$\chi^2$ (p-value)
No	39 (32.5)	29 (74.4)	0.21 (0.650)
Yes	81 (67.5)	57 (70.4)	

Source: Field Data (2016)

### 3.7.8 Sources of Immunization Information Influences to Decision Making In Accessing Immunization Programme Services

In this study it was also shown that, the sources of information for the immunization programme services influences the decision making for young unmarried women to access the services.

#### 3.7.8.1 Influences of Radio and Television Spots to Decision Making In Accessing Immunization Programme Services

In this study, it was founded out that, there is a significance difference between young unmarried women who received immunization programme services information via radio and those who received information in television for timely vaccination. Most of young mothers who listen radio spots had taken their children for timely vaccination services (p value = 0.764). Airing immunization programme services using television shows no statistical significance in relation with timely vaccination (p value = 0.005). Immunization programme and immunization partners should therefore revise their communication plans and decide to use appropriate media channel as a strategy for effective and efficiency use of resources.

**Table 11:** The Relationship between the Radio and Television Information on EPI Services and the Timely Infants Vaccination (n=120)

Source of Information	Total (%)	Timely infants vaccination	$\chi^2$ (p-value)
<b>Radio</b>			
No	68 (56.7)	48 (70.5)	0.09 (0.764)
Yes	52 (43.3)	38 (73.1)	
<b>Television</b>			
No	97 (80.8)	75 (77.3)	7.96 (0.005)
Yes	23 (19.2)	11 (47.8)	

Source: Field Data (2016)

### 3.7.8.2 Influences of Posters and Newspapers Information on Immunization Services to Decision Making In Accessing Immunization Programme Services

In this study, it was observed that, posters and newspapers influenced in decision making of young unmarried for timely accessing the immunization programme services (Table 3.7.8.2). There were significant differences between the women who received immunization programme services through posters (p value = 0.157) and newspapers (p value = 0.0227) when compared with other sources of information. These findings suggest that, the immunization programme should invest in posters and newspapers. However, posters are the best option when compared to newspapers. This is because they newspapers are mostly available in urban areas and therefore have limited geographical area distribution.

**Table 12:** The Relationship between the Posters and Newspapers Information on EPI Services and the Timely Infants Vaccination (n=120)

Source of Information	Total (%)	Timely infants vaccination	$\chi^2$ (p-value)
<b>Posters</b>			
No	84 (70.0)	57 (67.9)	2.00 (0.157)
Yes	36 (30.0)	29 (80.6)	
<b>New papers</b>			
No	114 (95.0)	83 (72.8)	1.46 (0.227)
Yes	6 (5.0)	3 (50.0)	

Source: Field Data (2016)

### 3.7.8.3 Influences of Health Workers, Friends and Public Meetings on Immunization Services to Decision Making In Accessing Immunization Programme Services

In this study, it was observed (as shown in Table 3.7.8.3), that health care workers information had significant influence in improving decision making of young unmarried women for timely vaccination (p value = 0.0229). The friends and public meeting showed to have no influence in terms of increasing immunization programme services access, for the young unmarried women. This is another area which need to be considered by the national immunization programme; instead of spending resources for public meetings they can use the money for alternative strategies for awareness creation.

**Table 13:**The Relationship between the Information Received From Health Care Workers, Friend and the Timely Infants Vaccination (n=120)

Source of Information for Unmarried Young Women	Total (%)	Timely Vaccination Infants	$\chi^2$ (p-value)
<b>Health care workers</b>			
No	33 (27.5)	21 (63.6)	1.45 (0.229)
Yes	87 (72.5)	65 (74.7)	
<b>Friend</b>			
No	96 (80.0)	74 (77.1)	6.94 (0.008)
Yes	24 (20.0)	12 (50.0)	
<b>Public Meeting</b>			
No	109 (90.8)	84 (77.1)	17.06 (<0.001)
Yes	11 (9.2)	2 (18.2)	

Source; Field data (2016)

### 3.7.8.4 The Concerns on Transmission of Vaccines Preventable Diseases Infections to Infants of Unmarried Young Women

In this study, as shown in table 3.7.8.4 which is indicating that, 67.5 % of mothers who were vaccinated were aware of timely of VPDs. However, among these women who are aware of VPDs, 70.4 % had timely vaccination of their infants. The study disclosed that, there is statistical significant difference in knowing VPDs and timely vaccination (p value = 0.650). There is therefore need to improve young unmarried women knowledge on VPDs as a strategy of increasing their access to immunization programme services as they will be feared on the VPDs fatalities.

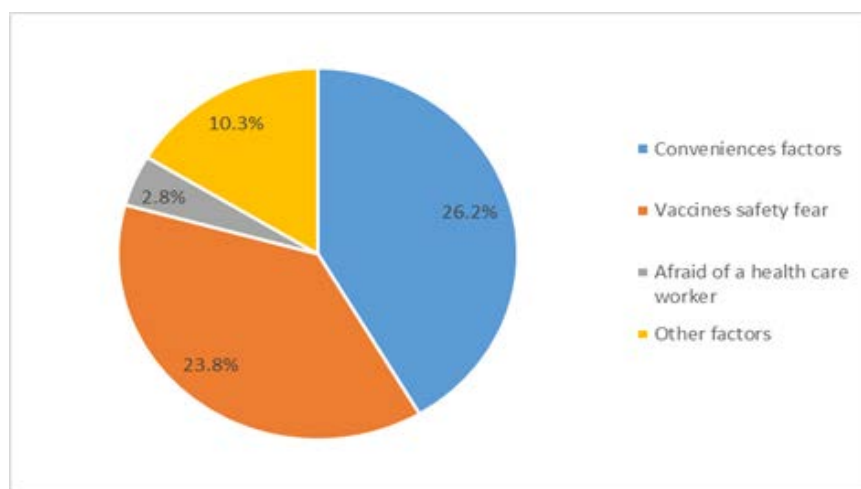
**Table 14:**The Relationship between the Mothers Knowledge on VPDs for the Young Unmarried Mothers and the Timely Infants Vaccination (n=120)

Mother's knowledge/concern on VPDs	Total (%)	Timely infants vaccination	$\chi^2$ (p-value)
No	39 (32.5)	29 (74.4)	0.21 (0.650)
Yes	81 (67.5)	57 (70.4)	

Source; Field data (2016)

### 3.7.9 Immunization Conveniences Influences to Decision Making In Accessing Immunization Programme Services

In this study immunization conveniences was identified to contribute 26.2 % of the young unmarried women with infants to delay or even not accessing at all immunization programme services (Figure 3.7.9). This is high (13.3 % difference), if compared to a study in USA, where convenience contributed only 15.9 % of delayed vaccination [53]. The common issues identified in the caregivers conveniences includes the caregivers schedule, the effect of distance to and from health facilities, regular vaccines stock outs and delayed sessions opening hours.



**Figure 5:** Distribution of Unmarried Young Women with Infants according To Barriers That Hinder Them to Access EPI services, (n=196)

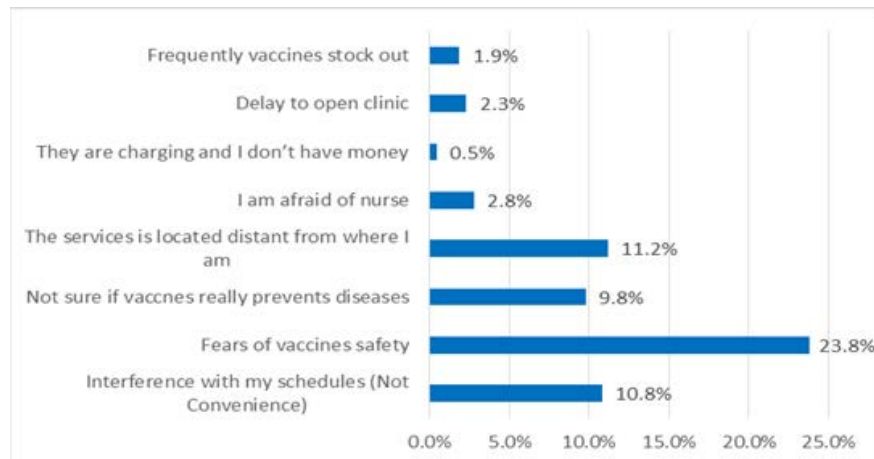
Source: Field Data (2016)

In this study it was realized that, 10.8 % of the interviewed women did not take their children for the vaccination services because of clinic days being interfering their schedule for other income generating activities (Figure 4.3.4.2).

In major cities, evening hours clinics and weekends could be the option as a solution for this problem. Vaccines stock out was only a problem in 1.9% of the interviewed women; this is low when compared with the WHO estimates of 44 % in 2014 and 10% in the review study conducted by Hutchins in 1993. Delayed in opening immunization clinic was found in 2.3% of the interviewed which is slightly lower compared 3% which was founded out by Amin and his colleagues (2013) in urban Dili [58].

The study also realized 2.8 % of the interviewed were worried on the nurses who are providing the services and 0.5 % (0.47 %) were afraid of being charged while had no money (figure 3.7.10). The two findings needs the management to streamline the health policy and guidelines especially immunization programme services, that

these services are free of charge and nurse should provide client friendly services.

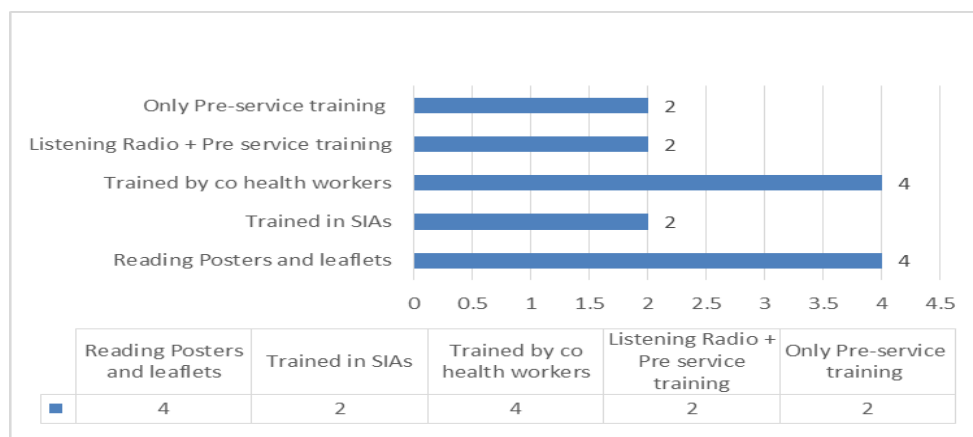


**Figure 6:** Distribution of Unmarried Young Women with Infants according To Barriers That Hinder Them to Access EPI Services, (n=196)

Source: Field Data (2016)

### 3.8 The Health Workers In-Depth Interview and Observation

In this study, 14 health workers interviewed using the in-depth guide and were observed on how were communicating with unmarried young women. It was observed that, only 8(57%) were able to explain in detail all vaccines and diseases which they prevented. In additional 7(50%) were able to provide five communication key information to unmarried young women on the vaccine type, number of doses to complete schedule, VPDs, possible adverse events and date of next visit. Furthermore, it was realized that Only 2(14%) had attended formal training in measles rubella campaign in 2014, most were oriented by their colleagues (28%) and reading posters and leaflets (28%) as shown in figure 4.4 below.



**Figure 7:** Distribution of Health Care Workers and their EPI Information Sources (n=14)

Source: Field Data (2016)

On the reasons why unmarried young women do not access health services, most health workers thought this was due to low awareness among unmarried young women (28% of interviewed health workers), fear to meet the nurses (28% health care workers), and feeling shame to meet older women in clinics (21% health workers). The other reasons were that, unmarried women are busy in income generating activities and some are living distant from health facilities. Not surprising, some health workers agreed that, they are rarely communicate politely with young women because themselves are not happy to see them with children. Majority of health care workers insisted on the health care workers training as a solution of the problem (36%), especially on the vaccines, communication skills and vaccines management. They also insisted on conducting house to house awareness creation using community health workers; because some of these unmarried young women are hide their children in houses. The other suggestions were to conduct outreach services and conduct sensitization to leaders.

#### **4. Conclusion**

The overall findings from the study indicated that, only 61.2% of the interviewed unmarried young women with infants in Temeke Municipality had access to immunization programme services. Out of those unmarried young women who had no access to immunization programme services, 1 in every 3 was not informed on the availability of immunization programme services; 24% were afraid of vaccines safety and 10% were not sure if vaccines prevent VPDs. Furthermore, the study found out that, 27 % of young unmarried women are not aware of VPDs irrespective of taking their children for immunization programme services. The level of education (completion of secondary and tertiary school), skilled job, mother's awareness on immunization programme services and VPDs was shown to have a relation with likelihood of timely infant vaccination. The main source of immunization programme services information for the interviewed unmarried young women was receiving information from the health workers (67.3%), radio spots (47.7%) and immunization services posters (39.3%). This is one of the reasons of why if the immunization programme is adding new services out of the normal used schedule, the coverage of the newly introduced service remained low compared to others. A good example is the measles second dose, in which the coverage stands at 60% compared to first dose which is 99% [10]. It is also very important to realize that, investment in health workers and radio spots could bring positive results in terms of increasing access to immunization programme services. Furthermore, the younger the age the more likelihood to even not accessing immunization programme and get the services timely. It is good to discourage early pregnancies, however in case it happen there should be a mechanism to ensure the young unmarried women have equal access to the available immunization programme services. The mother's education on the other hand, has an influence in making decision for accessing immunization programme services. In this regard, the education sector should be geared to improve women education as will have impact in their health and the health of their children. The education is also linked with opportunity of getting skilled or non-skilled jobs. The partially skilled jobs (like tailor) seemed to be labour intensive and provide less time for the women to take care of their children and hence delayed in accessing immunization programme services. Finally the study found out that, the unmarried young women were less informed on the VPDs is also less concern on their transmission. The health workers are less active in delivering messages regarding vaccines and VPDs. In this regard, infants of unmarried young women in Temeke Municipality are therefore remained at the risks of infected with VPDs if no appropriate action can be taken by increasing awareness on vaccination and reduce social barriers.

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