SOCIAL AND ECONOMIC FACTORS ASSOCIATED WITH VACCINE HESITANCY AMONG PARENTS OF INFANTS IN NAIROBI COUNTY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS OF PUBLIC HEALTH, IN THE DEPARTMENT OF PUBLIC AND GLOBAL HEALTH, UNIVERSITY OF NAIROBI

October 2022

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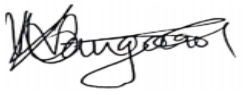
Signature: 

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ACKNOWLEDGEMENTS

I am most grateful to the Almighty for His providence. His grace has made this journey possible.

Secondly I am thankful to everyone who has helped me stay focused and resilient by giving their support and encouragement so generously. My profound gratitude goes to my supervisor Dr. Richard Ayah for his mentorship, invaluable support and guidance.

Special thanks to the Kamweru family for being my cheer leaders and to my study group & cohort for their inspiration and support throughout the study period.

DEDICATION

This work is dedicated to my late grandma, Teresa senior and to my precious children, Aryanna, Arthur, Alex and Aydan. Anything worthwhile is hardly ever easy.

LIST OF ABBREVIATIONS/ACRONYMS

EPI Expanded Program on Immunization

GVAP Global Vaccine Action Plan

HBM Health Belief Model

HIC High Income Countries

KNBS Kenya National Bureau of Statistics

Ksh Kenyan Shillings

NACOSTI National Commission for Science, Technology and Innovation

UHC Universal Health Coverage

UK United Kingdom

UNICEF United Nations Children's Fund

US United States

USA United States of America

VH Vaccine hesitancy

VPD Vaccine Preventable Diseases

WHO World Health Organization

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OPERATIONAL DEFINITIONS

Economic factors – Influences to a person's financial status such as education, employment status and income.

Social factors – Influences to a person's behavior such as religion and culture.

Influence – Behavior or action obtained without obvious effort or direct command.

Education – Formal school levels attended as per the Ministry of education guidelines i.e. Primary, Secondary, and Tertiary.

Employment status – How a person earns their income i.e formally (white collar jobs) or informally (blue-collar jobs).

Income – Money received in the household monthly.

Infant – A child between born between zero and twelve months prior to the researcher's visit to the household.

Vaccination – The action of introducing to the body a substance that stimulates the body's immune system to defend against specific illness/disease.

Immunization – The process through which a person becomes protected against developing a specific disease despite exposure to the disease-causing factor.

Vaccine acceptance – Allowing the child (ren) to obtain vaccination and availing them to a registered health facility for vaccination as per the ministry of health's guidelines.

Vaccine refusal – Preventing the child (ren) from obtaining vaccination through direct denial or withholding required resources such as time or finances.

Vaccine Hesitancy - Delay in acceptance or refusal of vaccines despite availability of safe and effective vaccines. The term includes, delaying vaccines, accepting vaccines but remaining uncertain about their use, accepting certain vaccines but not others and total refusal to vaccinate.

ABSTRACT

Background Vaccine hesitancy (VH) is a spectrum ranging from total acceptance to absolute refusal of vaccines and includes deferring the decision to vaccinate, agreeing to vaccinate but staying doubtful about the safety or effectiveness of the vaccines, being receptive to some vaccines and not others and total refusal to vaccinate. Vaccine hesitancy is indeed a great public health issue as it has been shown to result in higher odds of untimely vaccination and could also or subsequently increase the risk of VPD outbreaks and epidemics in populations where the vaccine uptake is lower than what is required to warrant herd immunity. An evidence-based understanding of the prevalence of vaccine hesitancy in Kenya as well as the demographic, economic and sociocultural drivers of the same may allow health practitioners and policymakers to design more effective programmatic interventions around childhood immunizations by using a wider approach that incorporates the scope of vaccine hesitancy and possible drivers of the same.

Objectives This study sought to investigate the social and economic factors that influence the decision to take up vaccination of infants among residents of Eastleigh North and Eastleigh South Wards in Kamukunji, Nairobi County. It also sought to investigate the prevalence of Vaccine hesitancy in this study population.

Methodology A cross-sectional study design was employed. Through a questionaire, data was collected from 423 randomly selected households on the parents' decision to vaccinate their child(ren). Logistic regression analysis was conducted to test the relationship between the participants' economic and sociocultural factors and vaccine hesitancy.

Results Vaccine hesitancy was found to be present in slightly more than half of the study population (51%, n=219). Monthly income category and tribe were associated with the odds of

Vaccine Hesitancy (VH). Compared to households with an income slightly above minimum wage (Ksh 10,000-20,000) those with household income below minimum age (Kshs 5,000-10,000) had twice the odds of VH (OR=2.07, 95% CI [1.0835,3.9730]) while those with higher household income i.e Kshs 30,000-50,000 had 68% less odds of VH (OR=0.32, 95%CI [0.1359,0.7373]), controlling for the effect of tribe.

Compared to the Somali tribe, the tribes Kamba (p=0.011) and Luo (p=0.028) were found to be significant predictors of the odds of VH at a 5% significance level, controlling for the parents' or care-givers' monthly income category.

Conclusion

Vaccine hesitancy could be plaguing the efforts by the government and other players to increase the uptake of childhood vaccination and decrease VPDs in Nairobi, Kenya. The greatest contributor of VH in this study population was lack of trust in the safety and effectiveness of the vaccines. There was a statistically significant association between household income and belonging to the Kamba or Luo tribes and VH, controlling for the effects of each other.

Recommendations

Health workers should conduct health education meetings with parents and care-givers attending the maternal and child health clinics focusing on the safety and efficacy of childhood vaccinations. The government and partners should prioritize on government facilities when it comes to ensuring that childhood vaccines are fully stocked. Employers should be encouraged to follow the guidelines set by the government on minimum wages as this might reduce hesitancy to childhood vaccination among parents of low socioeconomic status. Additionally, researchers should conduct In-depth qualitative studies focusing on the Luo and Kamba communities in order to unfold any

unique behavioral, social or cultural patterns they could have that could explain the association with vaccine hesitancy.

1 INTRODUCTION

1.1 Background

Vaccination is one of the most successful cautionary public health interventions against vaccine preventable diseases (VPD)s such as measles, poliomyelitis, diphtheria, pertussis (whooping cough), tetanus and tuberculosis among others (Stein, 2011). The importance of vaccines became more apparent after smallpox was successfully eradicated through vaccination in 1974. Following this success, the Expanded Program on Immunization (EPI) was initiated by the World Health Organization (WHO) with an initial recommendation of six vaccines namely tuberculosis, pertussis (whooping cough), diphtheria, tetanus, polio, and measles. According to the national immunization schedule in Kenya, a child is fully immunized if they have received one dose of BCG vaccination against Tuberculosis, three doses of the pentavalent vaccine against Diphtheria, Pertussis, Tetanus, Hepatitis B and Hemophilus influenzae, three doses of Polio vaccine (excluding the dose given at birth), one dose of pneumococcal and rotavirus vaccines, one dose of yellow fever vaccine (in some parts of the country) and two doses of the Measles-Rubella (MR) vaccine at least one dose of Measles vaccine (KENYA, 2015; WHO, 2018).

In March 2012, the WHO Strategic Advisory Group of Experts (SAGE) on immunization formed a working group on vaccine hesitancy following concerns noted on the impact that reluctance in accepting immunization had on vaccine uptake in both developing and developed countries. This working group later defined vaccine hesitancy (VH) as a delay in acceptance or the refusal of vaccines despite their availability (WHO, 2014). VH was further described as a spectrum ranging from total acceptance to absolute refusal of vaccines (MacDonald & SAGE, 2015) and includes deferring the decision to vaccinate, agreeing to vaccinate but staying doubtful about the safety or effectiveness of the vaccines, being receptive to some vaccines and not others and total refusal to

vaccinate. It is in this regard that VH is described in this study population as the failure to trust the safety and effectiveness of vaccination regardless of one's vaccination uptake, the delay or lack of child vaccination by the parents influenced by their busy lifestyle, the refusal to vaccinate one's children due to the cost or mode of delivery of the vaccines or overall refusal to vaccinate.

The Global health community through the Global Vaccine Action Plan (GAVI), targets a world without case fatalities from VPDs. A key target of GAVI in Africa was to have more than 90% of children vaccinated with three doses of a diphtheria-tetanus-pertussis containing vaccine by 2015. Roughly 62% of African countries including Kenya failed to achieve this target (WHO & UNICEF, 2019). Kenya, as a signatory to GAVI, was dedicated in ensuring full immunization of at least 90% of all children by the year 2020 in addition to establishing a vaccination coverage of 80% in each administrative unit (Allan, Adetifa, & Abbas, 2021). Vaccine hesitancy could be a potential challenge to the national immunization program in achieving such targets because it could decrease immunization coverage (Cooper, Betsch, Sambala, McHiza, & Wiysonge, 2018). The Ministry of Health- Kenya (MoH-Kenya) through a statement issued in December 2021, disclosed that about 17% of children less than one year of age do not complete their scheduled vaccines and only half of those less than two years had received their second shot of MR vaccine.

Vaccine hesitancy is indeed a great public health issue as it has been shown to result in higher odds of untimely vaccination (Dube et al., 2013) and could also or subsequently increase the risk of VPD outbreaks and epidemics in populations where the vaccine uptake is lower than what is required to warrant herd immunity (Dube et al., 2013; WHO, 2014). The prevalence of parental hesitancy to childhood vaccination has been identified to be as high as 25% and 19.5% in the years 2018 and 2019 respectively in the United States (US) (Nguyen et al., 2022; Santibanez et al., 2020). According to a cross-sectional study done in Italy to assess VH among parents, roughly 22% and

18% of the respondents respectively declared that they delayed or refused at least one vaccination shot for their children (Napolitano, D'Alessandro, & Angelillo, 2018). In Africa, studies on prevalence and predictors of childhood VH are minimal but one done in a peri-urban settlement in Uganda identified a prevalence of 27.8% with around 3% of the parents interviewed giving a history of having refused to take their child(ren) for vaccination in the past (Kijjambu, 2021). Furthermore, in Sudan, a study on determinants of measles VH among Sudanese parents showed that a fifth of them had hesitations regarding the measles vaccine (Sabahelzain, Moukhyer, Bosma, & van den Borne, 2021).

While vaccination for an increasing number of children is delayed or missed entirely due to intentional omission by the parent (Lancet, 2019), the decision to vaccinate or not to vaccinate one's child has been shown to be complex and context specific with the decision-making process ranging from total acceptance to absolute rejection of some or all types of vaccines. The decision could be influenced by a combination of factors such as confidence in the vaccine process (safety, adequacy of the delivery system and competence of the health worker) convenience (availability, affordability and health literacy), complacency (perceived disease risk) and community factors such as media and social norms (MacDonald & SAGE, 2015). Other factors that have been shown to play a role in childhood VH include forgetfulness by the parents and not having the child's pediatrician specifically recommending the vaccines (Napolitano et al., 2018), parental level of education and belief in the importance of vaccine (Kijjambu, 2021) and concerns on the safety of the vaccines (Wagner et al., 2021).

While studies focusing on childhood vaccine uptake and predictors of the same have been conducted in Kenya (Masters et al., 2019; Mutua, Kimani-Murage, & Ettarh, 2011; Ndiritu et al., 2006), none specifically focus on vaccine hesitancy as a continuum between total refusal and

acceptance of vaccinations. An evidence-based understanding of the prevalence of vaccine hesitancy in Kenya as well as the demographic, economic and sociocultural drivers of the same may allow health practitioners and policymakers to design more effective programmatic interventions around childhood immunizations by using a wider approach that incorporates the scope of vaccine hesitancy and possible drivers of the same. The main objective of this study is therefore to identify the prevalence and drivers of childhood VH among parents in Eastleigh North and Eastleigh South Wards in Kamukunji, Nairobi County.

1.2 Problem statement

In Kenya, roughly 64,500 children under 5 years of age die mostly of preventable causes every year (75% before their first birthday), with children living in Kenya's northern counties and the urban informal settlements being most affected (UNICEF, 2020). Child immunization against common VPDs such as tuberculosis, diphtheria, whooping cough (pertussis), tetanus, polio and measles is a key strategy towards reducing under-5 mortality (KENYA, 2015). The pneumococcal vaccine that was introduced to Kenya in the year 2012 protects against severe pneumonia, one of the major causes of infant and child mortality.

The last Kenya Demographic and Health Survey (KDHS), shows that only 79% of children aged 12-23 months were fully vaccinated with the coverage rates ranging from 51.1% in North Eastern province to 90% in Central Province. Among the counties, Nairobi recorded the fourth lowest full childhood vaccination rate at 74.4% (KENYA, 2015). While there was an improvement noted from the last KDHS done in 2008, these rates are still below the 90-95% proportion of fully vaccinated children that would be needed to warrant herd immunity and subsequently prevent outbreaks and transmission of VPDs (Anderson & May, 1985).

Vaccine hesitancy (delays and refusal to take up vaccines) at individual and community level could be at the core of suboptimal vaccination coverage rates (MacDonald & SAGE, 2015) and an understated barrier to efficient and effective control of morbidity and mortality caused by VPDs such as Haemophilus influenzae type b, varicella, pneumonia, measles and pertussis among children (Nguyen et al., 2022; Salmon, Dudley, Glanz, & Omer, 2015). Like in other countries in Africa, hesitancy towards the recommended childhood vaccines is present in Kenya and has been demonstrated to be a complex phenomenon driven by interconnected factors such as those surrounding the care-giver, health system and/or community context (Adamu et al., 2021).

1.3 Study Justification

National immunization strategies such as mass childhood vaccination against VPDs would actualize greater coverage if the parental attitude and concerns towards childhood vaccination (leading to vaccine hesitancy) are well understood and addressed prior. Although several studies surrounding vaccination coverage and uptake have been done in Kenya i.e. Masters et al., 2019; Mutua, Kimani-Murage, & Ettarh, 2011; Ndiritu et al., 2006), studies on vaccine hesitancy and drivers of the same, even in Africa as a whole, are not readily available despite it being a possible contributor to lower vaccination coverage.

Findings from this study will not only provide health policy makers with a better understanding of the scope of VH in Kenya but will also provide evidence on important economic and social factors that contribute towards VH. These findings could reinforce the existing but limited knowledge on parental VH available locally. The findings would also inform more focused and evidence-based strategies by the Kenya National Immunization programme and other stakeholders to curb vaccine hesitancy and improve the likelihood of full childhood vaccination rates by incorporating

communication and behavioural strategies targeting the various drivers of VH. This would in turn lead to a decrease in morbidity and mortality from vaccine preventable illnesses in the country.

1.4 Study Question

What factors influence the parental decision to take up infant vaccination?

1.5 Broad Objective

This study seeks to investigate the social and economic factors that are associated with the decision to take up vaccination of infants among residents of Eastleigh North and Eastleigh South Wards in Kamukunji, Nairobi County.

1.5.1 Primary Objective

To determine the demographic, economic and socio-cultural factors that influence the decision to take up vaccination of infants among residents of Eastleigh North and Eastleigh South Wards in Kamukunji, Nairobi County.

1.5.2 Secondary Objectives

1. To describe the prevalence of vaccine hesitancy in Eastleigh North and Eastleigh South Wards in Kamukunji, Nairobi County.
2. To identify the concerns of parents about the decision to vaccinate infants among residents of Eastleigh North and Eastleigh South Wards in Kamukunji, Nairobi County.

2 LITERATURE REVIEW

2.1 Introduction

The factors that drive vaccine hesitancy can be categorized under three main themes i.e., demographic, social-cultural and economic drivers of vaccine hesitancy. This chapter will outline literature on the scope and factors influencing vaccine hesitancy under these three categories.

2.2 Scope of vaccine hesitancy

Vaccine hesitancy is a public health concern and barrier to successful immunization strategies in both high income and low- and middle-income countries (LMIC) s. In Italy for example, a survey on socioeconomic determinants of VH done between December 2016 and April 2017 prior to the introduction of compulsory childhood vaccination in the country showed that 32.4% of families were hesitant to vaccination (Bertoncello et al., 2020). A similar study done in the United Arab Emirates (UAS) showed a VH prevalence of 12% with 35% reporting that they feared the side effects, 17% and 28% respectively being unsure and concerned about the safety of the vaccines and a further 28% fearing that the children would be getting too many injections (Alsuwaidi et al., 2020). In the USA, national telephone surveys of households with children between 6 months and 17 years conducted in the years 2018 and 2019 showed a prevalence of VH of 25.8% and 19.5% in the 2 years respectively (Santibanez et al., 2020). In Ireland, 6.7% of a convenient sample of parents assessed using the Parent Attitudes about Childhood Vaccines (PACV) scale were vaccine hesitant (score $\geq$ 50) with concerns on the side effects (36.2%), safety (20%) and great number of vaccines administered (13.3%) cited as the main reasons for hesitancy (Marshall, Moore, Sahm, & Fleming, 2021).

Parental hesitancy to pediatric vaccinations has also been reported in LMICs. A majority (83%) of families assessed for VH towards childhood vaccination during a study conducted in the slum areas of Siliguri in India in the year 2016 were vaccine hesitant despite a greater proportion (73.2%) stating that they believed that vaccines were protective against childhood illnesses (Dasgupta, Bhattacherjee, Mukherjee, & Dasgupta, 2018). According to a study on VH conducted among caregivers in Addis Ababa, Ethiopia, 3.4% and 3.7% of the caregivers reported ever hesitating and refusing a vaccine for their child respectively. In the same study, VH was shown to significantly increase the odds of untimely vaccination (AOR 1.94, 95% CI: 1.02, 3.71) (Masters, Tefera, Wagner, & Boulton, 2018). In a cross-sectional study conducted in Khartoum in the year 2019, it was reported that of Sudanese parents assessed for measles, in roughly 17.8% VH had delayed vaccination for their child for reasons other than illness or allergy. The parents who stated that they were concerned about the effectiveness, safety and side effects of the vaccines were 16.6%, 13% and 19% respectively (Sabahelzain et al., 2021). In East Africa, prevalence of parental VH has been established at 27.6% in Uganda (Kijjambu, 2021).

Furthermore, childhood VH has been reported in parents as early as during their pregnancy period. A cross-sectional study conducted among a group of 1081 pregnant women seeking antenatal care (ANC) services at a hospital in Kuala Lumpar in Malaysia reported that 8% of the women were vaccine hesitant (Kalok et al., 2020) while a VH prevalence of 8.2% was recorded among pregnant mothers in Houston, Texas (Cunningham et al., 2018).

2.3 Factors influencing parental vaccine hesitancy

2.3.1 Demographic and socioeconomic factors

According to Adamu et al., 2021, drivers of hesitancy towards recommended pediatric vaccinations in the African setting can be categorized into community context, health-systems related and care-giver related factors. Demographic factors such as increasing maternal and child age and increasing birth order are examples of care-giver related drivers of VH (Adamu et al., 2021). A cross-sectional study on determinants of measles vaccine hesitancy among caregivers in Sudan also showed an association between VH and maternal age (β=0.112, p-value = 0.017) (Sabahelzain et al., 2021). Other than maternal age, marital status of the parent could be a demographic predictor of VH. According to a cross-sectional study on VH and its determinants among parents in the UAE, divorced marital status was significantly associated with VH (AOR:15.6, 95%CI 2.9,82.6, p-value < 0.001) (Alsuwaidi et al., 2020).

Parental employment status, monthly income and educational level could also contribute towards VH. The study by Bertoncello et al., 2020 showed that perceived economic hardship (AOR 1.59, 95% CI: 1.001, 2.525) and lower parental educational level (AOR 3.39, 95% CI: 1.241, 9.284) were significant factors that influenced VH and vaccine refusal among care-givers. According to a different study on VH among parents that was carried out in Malaysia, a multi-ethnic country, unemployed parents were more likely to have VH compared to their employed counterparts (AOR 1.97, 95% CI: 1.08-3.59) (Mohd Azizi, Kew, & Moy, 2017). In a US-based study where almost ¼ of the parents reported being vaccine hesitant, the highest proportion of hesitancy was identified among mothers with a high school educational or less and households living below the poverty line at 30.1% and 35.6% respectively (Nguyen et al., 2022). Additionally, a study evaluating VH and its associated factors among parents in Shenzen, China showed a significant association

between the family size (number of children in the family) (β = -0.93, 95% CI: -1.31, 0.54) , annual family income (β= 1.64, 95% CI: 1.13-2.16) and parental level of education (father: β= -0.84, 95% CI: -1.37, 0.31 and mother: β = -1.59, 95% CI: -2.13, -1.05) (Shen et al., 2022).

The study by Dasgupta, Bhattacherjee, Mukherjee, & Dasgupta, 2018 conducted in Siliguri slums in India showed significantly lower odds of childhood VH among mothers with ≥ 5 years compared to those with < 5 years of education (AOR 0.301, 95% CI: 0.095, 0.957). In Malaysia, the odds of VH was shown to be roughly 4 times among pregnant mothers with secondary education level and below compared to those who had more advanced education (Kalok et al., 2020). Similarly, the odds of hesitancy towards childhood vaccines among pregnant mothers in a Texas-based study was 2.2 times higher among those with college level of education or less compared to those with a > 4 year degree (Cunningham et al., 2018). Educational level of the parent has also been shown to be a significant predictor of childhood VH in Uganda (AOR 3.73, 95% CI: 1.24, 18.7, p= 0.01) (Kijjambu, 2021).

2.3.2 Socio-cultural factors

Low autonomy among women is a sociocultural factor that could influence their ability to make timely decisions on behalf of the family and contribute towards VH. It is an example of a community context factor leading to VH according to Adamu et al., 2021. Other factors include belonging to a minority ethnic population and influence of religious leaders (Adamu et al., 2021). Religion has also been shown to be a significant predictor of hesitancy towards childhood vaccinations in Malaysia with non-islam mothers having roughly 6.7 times higher odds of VH compared to their islam counterparts (AOR 6.72, 95% CI: 1.18, 38.07, p= 0.03) (Kalok et al., 2020).

3 METHODOLOGY

3.1 Introduction

Guided by the STROBE statement on reporting of cross-sectional studies, this chapter outlines the study design, setting, participants, variables and conceptual framework, data sources, sample size calculation and sampling method used, statistical methods applied and the strategies put in place to minimize errors and bias.

3.2 Study design

This was a home-based analytical cross-sectional study that was carried out for a period of 6 weeks between July and August 2020. Through the study design employed, it would be possible to estimate the prevalence of vaccine hesitancy in the study population and simultaneously assess the drivers of the same.

3.3 Study area

This study was carried out in Kamukunji constituency. The constituency is one among the seventeen constituencies that constitute Nairobi County and comprises of central and Eastern areas of Nairobi, (KNBS, 2019). It is located within the Nairobi City council area. With a population density of 25,455 people per square kilometer, Kamukunji constituency ranks the second most populous constituency in the county (KNBS, 2019). The constituency consists of five wards i.e Eastleigh North, Eastleigh South, Pumwani, Air Base and California (KNBS, 2019). The study focused on the two largest wards within the constituency i.e Eastleigh North and Eastleigh South that have a population of 44,788 and 67,586 people respectively. Both wards cover a combined area of 2,000 acres and are categorized under high rise residential zone in the economic land classification (G. W. Asoka, Bunyasi, & Thuo, 2013).

Overall, 89% of Nairobi county residents have had some formal education. Kamukunji constituency has the highest number of residents with no formal education (24%) in the County. Further, of the 5 wards that comprise Kamukunji constituency, Eastleigh North ward has the highest proportion of residents without any formal education (41%). In Eastleigh South, 15% of the residents have had no formal education (KNBS & SID, 2013).

Commercial activity in the area is mainly informal characterized by multi-storey shopping malls, shops, hotels and eateries. Trade in items such as clothes, fabrics, cosmetics, electronics, furniture & fittings, jewelry and vehicle parts draws buyers from across the country and from other countries too (Carrier & Lochery, 2013). Local & International Cargo transfer services, formal & informal banking services, real estate business and a dense population within the wards and in the neighboring settlements provide auxiliary services to the thriving economic hub (G. Asoka, Thuo, & Bunyasi, 2013).

Eastleigh North Ward and Eastleigh South Wards are cosmopolitan with most inhabitants having immigrated into the area for commercial purposes (Eastleigh, 2016). Many of the inhabitants of the two wards were refugees from the early 1990s occasioned by the insecurity in Somalia, Ethiopia, and the larger Great Lakes region. Poor sanitation and crowded living conditions also characterizes the two wards. There are several health facilities in the area, predominantly private sector i.e. 5 hospitals (1 public, 4 private hospitals), 8 Nursing/maternity homes (1 NGO, 7 private), 1 health centre (Public), 6 dispensaries (2 public, 1 FBO, 3 Private) and 20 clinics (7 public, 2 FBO, 3 NGO, and 14 Private) (Nairobi, 2017).

3.4 Study population

3.4.1 Target population

This study targeted parents or primary care-givers living in Kamukunji constituency, Nairobi County who had at least one child under 5 years of age.

3.4.2 Source population

The study population consisted of all parents or primary care-givers living in Eastleigh North and Easteigh south wards of Kamukunji constituency who had at least one child under 5 years of age and who met the inclusion and exclusion criteria.

3.5 Selection criteria of the participants

3.5.1 Inclusion criteria

All parents or primary care givers of a child or children under 5 years of age and who were willing and able to give consent and participate in the study were included in this study.

3.5.2 Exclusion criteria

The study excluded any parents who were less than 18 years of age as it could be possible that they were still under the care of their parents hence not able to fully make decisions on behalf of their children.

3.6 Case and non-case definition

Parents with vaccine hesitancy (cases) were those who responded "Yes" to either refusing vaccination for a child in their household and/or having had their busy lifestyle prevent them from taking vaccines and/or refusing vaccination due to cost or mode of delivery or those who responded

"No" to trusting the safety and/or effectiveness of any vaccine given to their child. Non-cases on the other hand were all those parents who responded "No" to either refusing vaccination for a child in their household and/or having had their busy lifestyle prevent them from taking vaccines and/or refusing vaccination due to cost or mode of delivery or those who responded "Yes" to trusting the safety and/or effectiveness of any vaccine given to their child.

3.7 Sample size determination and sampling technique

3.7.1 Sample size determination

The Sample size was determined using Kelsey et al. (1996) formula for cross-sectional study study design that is shown below:

$$n_1 = \frac{(Z_\alpha + Z_\beta)^2 \bar{p}\bar{q}(r+1)}{r(p_1 - p_2)^2}$$

and

$$n_2 = rn_1$$

For all studies:

$$p_1 = \frac{p_2 OR}{1 + p_2(OR - 1)}$$

Where:

$Z_{\alpha/2}$ (1.96) and $Z_{1-\beta}$ (-0.84) are the required values specifying the 2-tailed confidence level of 95% and statistical power of 0.80 desired.

n_1 and n_2 are the number of parents with and without VH respectively, p1 was the proportion of parents with no level of formal education and with VH and p_2 was the proportion of parents with some level of formal education who still had VH that was set at **0.9** (Kijjambu, 2021). OR is the ratio of the primary exposure (no formal education) to non-exposure which was set at **0.73** (Kijjambu, 2021) while r (1) is the ratio of unexposed to exposed individuals.

Using the figures above and further increasing the estimated sample size by 15% to account for non-response and missing data (Suresh & Chandrashekara, 2012), a total sample size of 430 was arrived at.

3.8 Sampling procedure

Multistage sampling technique was applied in getting the study participants. Since Eastleigh North ward has a smaller population of 44,788 residents compared to Eastleigh South ward which has a population of 67,586 residents (KENYA, 2015), probability proportional to size sampling (PPS) was used to estimate the number of participants to be interviewed from each ward where the proportion of participants from each ward was weighted upon the total number of residents in that ward (Skinner, 2016). This resulted in an estimated number of 171 participants (40%) from Eastleigh North ward and 259 participants (60%) from Eastleigh South ward sampled from a similar number of households in the respective wards. In each ward, households were randomly selected and screened for their eligibility to be included into the study. Those with child (ren) under the age of 5 years and a caregiver above 18 years of age with the authority of primary decision making for the child (ren) were included into the study. Households that failed to meet the eligibility criteria were excluded from the investigation without replacement. This sampling procedure was followed until the desired sample size was reached. To avoid clustering of information, only one resident per household was interviewed in the event where there was more than one childcare giver or decision maker in the household who met the eligibility criteria for inclusion into the study.

3.9 Study variables

Vaccine hesitancy (VH) was the main outcome variable. In this study, VH was estimated from failure to trust the safety and effectiveness of vaccination regardless of one's vaccination uptake,

the delay or lack of child vaccination by the parents influenced by their busy lifestyle and the refusal to vaccinate one's children due to the cost or mode of delivery of the vaccines or overall refusal to vaccinate.

The predictor variables are categorized as follows:

1. Economic factors: Monthly income category, number of people living in the household and household breadwinner
2. Sociocultural factors: Tribe, a report of cultural influence on vaccination and family's primary decision maker
3. Demographic factors: Maternal age, marital status and level of completed education

Table 1: Predictor variables and their measurements

Variables (types)	**Measurement of the predictor variable**
Parents'/ care-givers' age (continuous)	This was captured in years
Parents'/ care-givers' sex (nominal)	This was captured as female and male
Marital status (nominal)	This was assessed in 5 categories i.e. Single, Married, Separated, Divorced or Widowed
Parents'/ care-givers' highest level of education (ordinal)	The level of education attained by the parent/care-giver was captured in the following levels: No formal education, Incomplete Primary, Complete Primary, Incomplete Secondary, Complete Secondary and Complete Tertiary

Household breadwinner (nominal)	This was captured in 5 categories i.e. Self, Spouse, Parent, Other
Monthly income category (ordinal)	Monthly household finances provided as a range i.e. 5000 -10000, 10000-20000, 20000-30000, 30000-50000, 50000-100000, >100,000, Don't know
Number of people living in the household (continuous)	Was determined by counting all the people who lived in the household
NHIF uptake (binary)	Was determined by whether or not the parents made their contributions to NHIF regularly
Tribe (nominal)	Assessed in the following categories; Somali, Kikuyu, Kamba, Luhya, Luo, Kisii, Mijikenda and others
Primary decision maker (nominal)	The primary decision maker was the person with overall authority over the household. This was either the Wife, Husband, Parents of spouse or another person who resided in the home.
Thoughts on important sex to vaccinate (nominal)	Assessed based on which sex was given priority in obtaining their vaccination categorized as boys, girls or both sexes.

3.10 Conceptual Framework

The conceptual framework is based on four variables namely: economic drivers, socio-cultural drivers, demographic drivers and vaccine hesitancy. Amongst the variables, economic drivers, socio-cultural drivers, and the demographics are independent variables as they lead to vaccine hesitancy. Vaccine hesitancy forms the dependent variable. When vaccine hesitancy persists, there would be persistent vulnerability to vaccine preventable diseases.

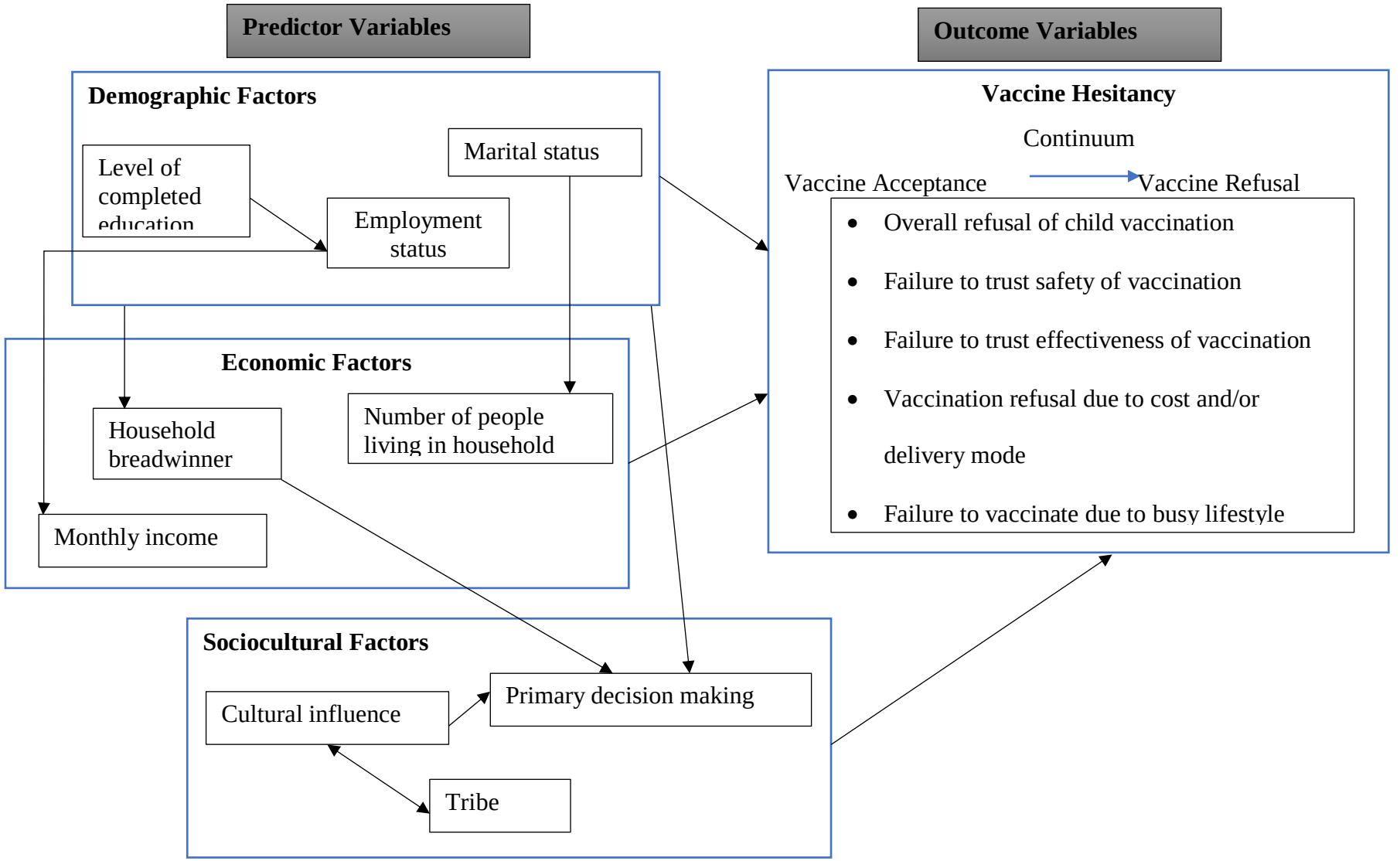
Predictor Variables
Outcome Variables
Demographic Factors
Level of completed education
Marital status
Employment status
Economic Factors
Household breadwinner
Number of people living in household
Monthly income
Sociocultural Factors
Cultural influence
Primary decision making
Tribe
Vaccine Hesitancy
Continuum
Vaccine Acceptance
Vaccine Refusal
Overall refusal of child vaccination
Failure to trust safety of vaccination
Failure to trust effectiveness of vaccination
Vaccination refusal due to cost and/or delivery mode
Failure to vaccinate due to busy lifestyle

Figure 1: Conceptual framework

3.11 Data collection

Six research assistants (RAs) were recruited based on competency. They were required to have at least a form four certificate with good communication skills. Prior to commencement of fieldwork, a full day training workshop for the research assistants was carried out in which the researcher provided the research assistants an overview of the study topic and study objectives, trained the assistants regarding the informed consent guidelines, data collection tool as well as administration of the documents and how to capture relevant field activities through field notes.

The RAs helped in the selection and screening of the households and participants for inclusion into the study. They also assisted in giving out the consent forms and study questionnaires and checking them for completeness after they had been filled in by the participants.

Using a structured questionnaire (appendix IX), information on the participants' demographic, economic and sociocultural characteristics in addition to their concerns surrounding vaccination was collected. Most of the questions were designed in a close-ended and in a Likert scale manner. The researcher together with two pre-trained research assistants recruited the participants to the study from household to household with reference to the inclusion/exclusion criteria as detailed above. The potential participants were briefed about the objectives of the study and any of their concerns addressed before being presented with the consent forms (appendix I-VI). Only those who agreed to sign the consent form proceeded to have their responses to the research questions recorded by the RA in the questionairies. Both the consent forms and study questionnaires were explained according to a participant's preferred language, either English, Kiswahili or Kisomali.

3.12 Data processing and analysis

The data collected was entered into Microsoft Excel spreadsheets by two independent data-entry personnel. To reduce data entry errors, the two data entry personnel cross-checked the data between them. The data was then cleaned and STATA version 11.2 used for analysis as described below.

Median values and their ranges were computed for the age of participants, number of people living in a household and participants' monthly income. Proportions were computed for categorical variables such as sex, marital status, tribe, educational level, NHIF knowledge and uptake, type of occupation, place of initial healthcare seeking, media influence, religious influence, family's decision maker and vaccine facility preference.

Participants were considered to have vaccine hesitancy if they either responded "Yes" to refusing vaccination for a child in their household, having had their busy lifestyle prevent them from taking vaccines, refusing vaccination due to cost or mode of delivery or responding "No" to either trusting the safety or effectiveness of any vaccine. With this, a binary variable termed 'Vaccine hesitancy' was generated. The prevalence of vaccine hesitancy was then estimated from the computed proportion of participants with a positive history of vaccine hesitancy.

Logistic regression analysis was conducted in order to test the demographic (marital status and level of completed education), economic (monthly income category, number of people living in the household and household breadwinner) and sociocultural (tribe, a report of cultural influence on vaccination and family's primary decision maker) variables as predictors of vaccine hesitancy. Univariable analysis between each predictor variable and VH was conducted at a liberal p-value of 0.20 (Dohoo, 2012). The variables with a p-value <0.20 i.e marital status, level of completed education, income per month, sum of people per household, household breadwinner, tribe, culture

and primary decision maker were added to the multivariable model where their association with the odds of VH was tested at a 5% significance level. Non-significant variables were eliminated from the multivariable model if they did not result in >30% change in the coefficient of the significant variables (Dohoo, 2012).

The Hosmer-lemeshow goodness of fit was computed to evaluate how well the final model consisting of the two main significant variables i.e monthly income category and tribe fit the data with a p-value>0.05 indicating a well-fitting model.

3.13 Ethical considerations

Ethical approval for this study was obtained from the KHN-UoN Ethics and Review Committee (KNH-ERC/A/130) on 24th April 2020. Administrative approval was also obtained from the National Commission for Science, Technology & Innovation (NACOSTI) via Research License Reference No. 188355 issued on 21st July 2020.Through the informed consent signing process, the study purpose was explained to the respondent and assurance provided to them that the study was voluntary. The participant was assured that they could withdraw or exit from the study at any point without affecting any service delivery to them. Further, the participant was informed that there was no monetary benefit from participating in the study but the study would be used to inform policy. Only trained personnel administered the questionnaires.

During the interview, where the researcher or RA noticed that a respondent was opposed to vaccinations for their child (ren) for no particular reason as was the case with one of the respondents in this study, information on risks and benefits of vaccination was given and the respondent encouraged to seek additional guidance from any registered health facility.

3.14 Limitations of the study

A limitation of the study is that the study design measured vaccine hesitancy in a specific time and place which may limit the generalizability of findings. Also, we did not specify the length of a respondent's residency in the study area and therefore could not establish whether they were new immigrants or were native to the area and therefore these communities might not be representative of all people belonging to the respective tribal communities.

4 RESULTS

4.1 Introduction

This chapter outlines the main findings from the study. First, it summarized the descriptive statistics of the study participants in terms of their demographic, socioeconomic and sociocultural characteristics. It then displays the prevalence of vaccine hesitancy in this study population and the major concerns surrounding childhood vaccination as recorded from a series of close-ended study questionnaires. Finally, it outlines the drivers of vaccine hesitancy in this study population as demonstrated from the results of the univariable and multivariable logistic regression models conducted.

4.2 Demographic characteristics

A total of 171 and 259 participants from Eastleigh North and South wards respectively were enrolled into the study but a total of 2 and 5 participants from the 2 respective wards did not fully complete their questionnaires rendering their data unreliable in the analysis. Therefore, data analyzed was from the remaining 423 participants only (169 from Eastleigh North and 254 from Eastleigh South).

As shown in table 2 below, the median age was 30 years with a range of 19 to 69 years. Nearly all respondents were female (97%, n=411) and roughly ¾ were married (75%, n=319). Approximately 16% (n=66) were single.

There was a median number of 4 people living in each household (range: 1-15 people, IQR=3).

A majority of the participants (69%, n=291) had not subscribed to the National Hospital Insurance Fund (NHIF).

4.3 Socioeconomic characteristics

Approximately 8% (n=32) of the study participants reported that they did not have any formal education and slightly more than 2/3 had completed secondary and post-secondary education (71%, n= 304). The distribution of participants who were in a paid occupation (49 %, n=210) was almost equal to that of participants who were not in a paid occupation (50%, n=212). Only 74% of the participants (n=313) gave responses regarding their income and of this, roughly two of out five (39%, n=123) earned between 5,000 and 10,000 Kenya shillings per month and 22% (n=70) earned between 10,000 and 20,000 Kenya shillings per month. About 6% of the respondents (n=18) said they did not know their monthly earnings. A majority of the participants (69%, n= 291) said that their spouse was the primary household breadwinner with 99% (n=289) of these participants being female. (Table 2)

4.4 Sociocultural characteristics

A larger proportion of the participants (30%, n=124) were from the Somali tribe followed by Kikuyu (20%, n=85) and Kamba (15%, n=62) tribes. Husbands were the primary decision makers in the families of 70.92% (n=300) of the participants with only 27.19% of the female participants (n=115) reporting that they could make family decisions on their own. While majority of the participants (91.02%, n=385) believed that it was important to vaccinate both boys and girls, a larger proportion felt that vaccinating girls (7.57%, n=32) was more important than vaccinating boys (1.42%, n=6). (Table 2)

Table 2: Sociodemographic characteristics of the study participants, n=423

Variable	Values/Category	Frequency n (%)	Median	Interquartile range (IQR)
Age (years)	19-69	-	30	11
Sex	Female	411 (97.1)	-	-
	Male	12 (2.8)	-	-
Marital status	Single	66 (15.6)	-	-
	Married	319 (75.4)	-	-
	Separated	11 (2.6)	-	-
	Divorced	10 (2.3)	-	-
	Widowed	17 (4.0)	-	-
Highest level of education	Tertiary Complete	27 (6.4)	-	-
	Secondary Complete	79 (18.7)	-	-
	Primary Complete	225 (53.2)	-	-
	Incomplete Secondary	44 (10.4)	-	-
	Incomplete Primary	16 (3.8)		
	No formal education	32 (7.6)		

Household breadwinner	Self Spouse Parent Other	124 (29.3) 291 (68.8) 7 (1.7) 1 (0.2)	- - - -	- - - -
Monthly income (Kenya shillings)	5000-10000 10000-20000 20000-30000 30000-50000 50000-100000 >100000 Don't know	123 (39.3) 70 (22.4) 25 (8.0) 48 (15.3) 27 (8.6) 2 (0.6) 18 (5.8)	- - - - - - -	- - - - - - -
Number of people living in household	1-15	-	4	3
NHIF uptake	Yes No	132 (31.2) 291 (68.8)	- -	- -
Tribe	Somali Kikuyu Kamba Luhya Luo Kisii	124 (29.5) 85 (20.2) 62 (14.8) 40 (9.5) 40 (9.5) 12 (2.9)	- - - - - -	- - - - - -

	Mijikenda Others	11 (2.6) 46 (10.9)	- -	- -
Primary decision maker	Wife Husband Parents Person I reside with	115 (27.2) 300 (70.9) 6 (1.4) 2 (0.5)	- - - -	- - - -
Thoughts on important sex to vaccinate	Both boys and girls Boys Girls	385 (91.0) 6 (1.4) 32 (7.6)	- - -	- - -

4.5 Scope of vaccine hesitancy and concerns surrounding vaccination

4.5.1 Scope of vaccine hesitancy

As shown in figure 2 below, vaccine hesitancy was present in slightly more than half of the study population (51%, n=219). Although a majority of the participants (99.0%) reported that they had never refused vaccination for any child in their household and approximately 81.3% said that they trusted the safety of vaccination, almost 2/5 (36.9%, n=156) did not trust vaccines to be effective in preventing childhood illnesses. The cost and mode of delivery of vaccines hindered vaccination uptake in a very small proportion of the population, 2.6% and 1.7% respectively. Notably, only 7.8% of the study participants reported that their busy lifestyle had interfered with an adherence to vaccination schedule for their children.

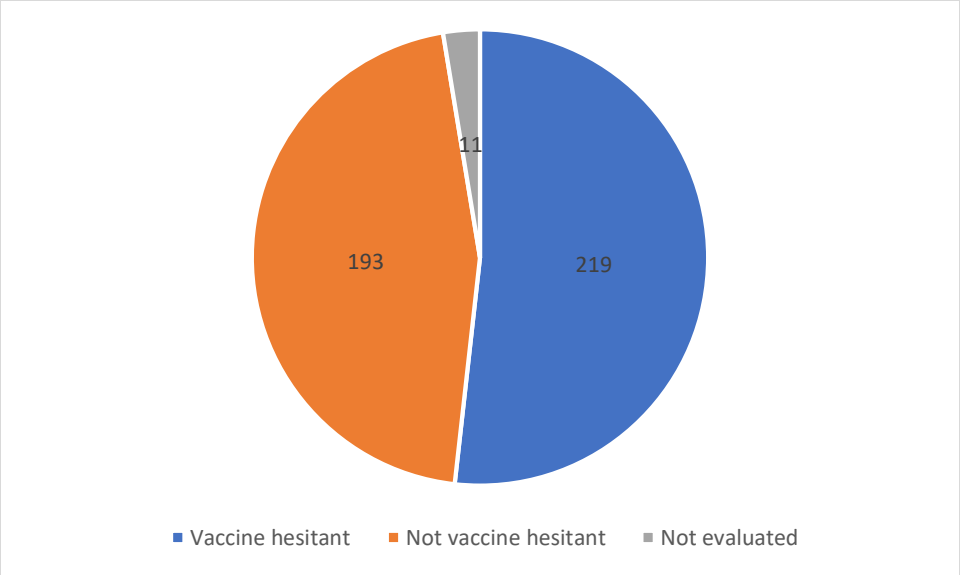

Figure 2: Prevalence of vaccine hesitancy among mothers of under-5s in Kamukunji, Nairobi County, n=423

4.6 Concerns surrounding vaccination

Table 3 summarizes the concerns towards childhood vaccination as reported by the parents. Although 98.82% (n=417) believed that the benefits for vaccination outweighed the risks involved, vaccination risks still concerned about half (50.12%, n=209) of the respondents. The most common risks of vaccination that concerned the parents as shown in figure 3 were fever (37.02%, n=67), death of the child (19.34%, n=35), disability (12.15%, n=22) and rickets (8.84%, n=16). Almost ¼ of the respondents (23.57%, n=99) did not believe that VPDs were serious conditions.

While 51.82% (n=214) believed that it was possible to have too many vaccinations, a larger proportion (61.76%, n=260) preferred getting multiple vaccines in individual shots compared to in one shot (34.92%, n=147).

Vaccination schedules did not make adherence difficult for a larger proportion of the participants (98.35%, n= 416) and majority (63.36%, n=268) strongly agreed that it was important to adhere

to the child vaccination schedule given by the Ministry of Health (MOH). Government and private facilities were the preferred vaccination sites for respectively 85.58% (n=362) and 10.64% (n=45) of the respondents. Notably, 18.29% (n=77) gave a positive history of being sent back home because a vaccination was not available in a facility they visited.

Majority of the participants (98.8%, n=418) reported that their culture did not discourage them from vaccinating their children. However, about 8 % (n=32) thought it was more important to vaccinate girls compared to boys. Approximately 13.9% of the participants reported that the media had an influence on whether they vaccinated their children or not. Slightly more than ½ of the participants (51.7%, n=217) recorded that their children's schools did not require or advise them to vaccinate their children. About 56.8 % (n=239) of the respondents were bothered by the refusal of other parents to vaccinate their children.

Table 3: Child vaccination concerns among parents in Kamkunji constituency

Concern	**Response**	**Frequency n=423 (%)**
Worried about the risks involved	Yes	209 (50.1)
	No	207 (49.6)
	Not sure	1 (0.2)
Do the benefits outweigh the risks?	Yes	417 (98.8)
	No	5 (1.8)
Possible to have too many vaccines	Yes	214 (51.8)
	No	196 (47.6)
	Not sure	3 (0.7)

Preferred mode of delivery for multiple vaccines	Combined as 1 shot Given as individual shots As advised by HCP	147 (34.9) 260 (61.6) 14 (3.3)
Are Vaccine Preventable Diseases serious?	Yes No Not sure	320 (76.2) 99 (23.6) 1 (0.2)
Some vaccines are difficult to get because of the vaccination schedule	Yes No	7 (1.7) 416 (98.4)
Adherence to MOH vaccination schedule is important	Neither agree nor disagree Agree Strongly agree	9 (2.1) 146 (34.5) 268 (63.4)
Child's school requires or advises for vaccination	Yes No	203 (48.3) 217 (51.7)
Worried about parents delaying or refusing vaccines, putting other children at risk	Yes No	239 (56.8) 182 (43.2)
My culture discourages me from vaccinating my children	Yes No	5 (1.2) 418 (98.8)
Thoughts on the more important sex to vaccinate	Both are important Boys Girls	385 (91.0) 6 (1.4) 32 (7.6)

The media influences my decision to vaccinate	Yes No	59 (13.9) 364 (86.1)
Preferred vaccination facility	Government Private Faith-based Any	362 (85.6) 45 (10.6) 4 (0.9) 12 (2.8)
History of being sent home because of lack of a vaccine	Yes No	77 (18.3) 217 (51.7)

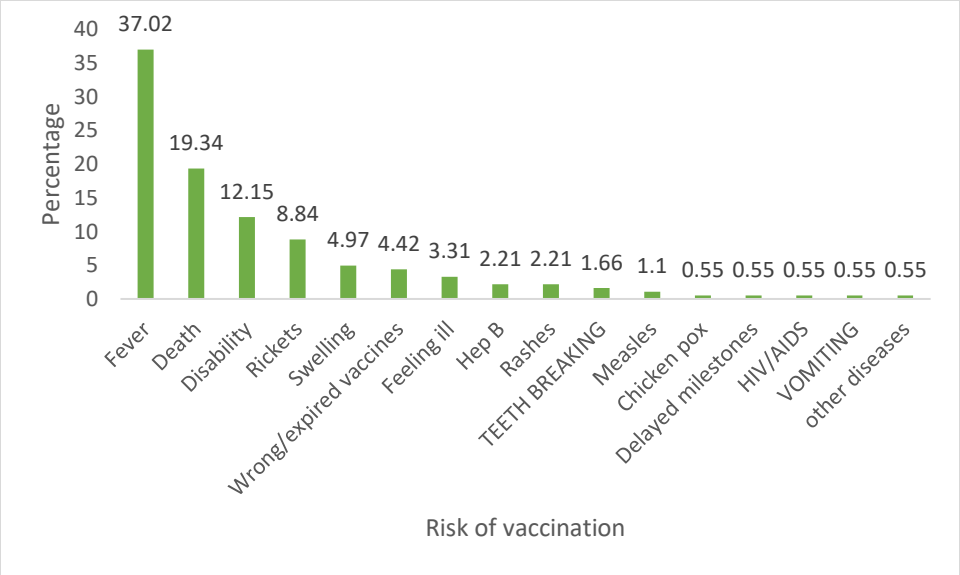

Figure 3: Proportion of risks associated with vaccines as reported by respondents

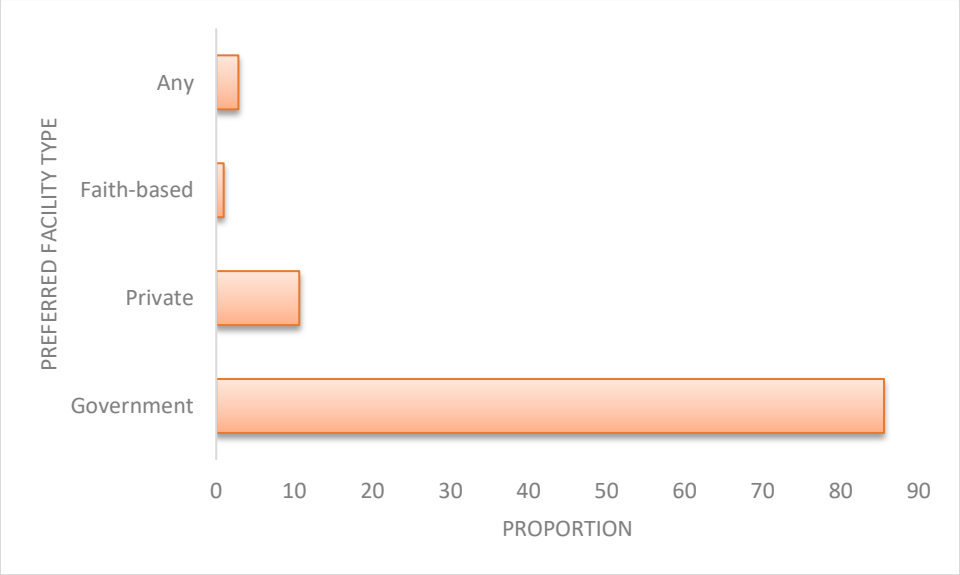

Figure 4: Preference of Vaccination Facility

4.7 Demographic. Socio-economic and sociocultural drivers of vaccine hesitancy

4.7.1 Results of the univariable logistic regression (Table 4)

In the univariable logistic regression, only marital status (p=0.0111) and level of completed education (p=0.0568) were significantly associated with VH at 20% level of significance. At the same liberal significance level, the economic factors that were significantly associated with VH included category of monthly income (p=0.0001), number of people living in the household (p=0.0053) and the breadwinner (p=0.0620). Tribe (p=0.0147), culture (p=0.1250) and the primary decision maker in the family (p=0.1430) were the only sociocultural factors found to be significantly associated with VH at the liberal p-value of <0.20. These factors were added to the multivariable model.

Table 4: Univariable logistic regression analysis of the demographic, socioeconomic and sociodemographic drivers of vaccine hesitancy (VH)

Variable	**Values**	**Outcome, N=412**				
		VH+ * n (%) 219(53.16)	**VH-* n (%) 193(46.84)**	**OR**	**95% Confidence interval (CI)**	**LRT P-value**
Age	19-69	-	-	1.01	0.98-1.03	0.3494
Sex of respondent	Male Female	6 (2.74) 213 (97.26)	6 (3.11) 187 (96.89)	0.88 Ref	0.27-2.76 -	0.8242 -
[a]Marital status	Divorced Separated Widowed Married Single	6 (2.74) 11(5.02) 15(6.85) 155(70.78) 32(14.61)	4(2.07) 0 (0) 2(1.04) 154(79.79) 33(17.10)	Ref Omitted 5.00 0.67 0.65	- - 0.71-34.91 0.18-2.42 0.16 -2.50	 0.0111
[b]Education	Incomplete Primary	5 (2.28)	11 (5.70)	0.51	0.15-1.82	

	Incomplete Secondary	26 (11.87)	16 (8.29)	1.84	0.72-4.68	
	Complete Primary	14 (6.39)	13 (6.74)	1.2	0.43-3.40	0.0568
	Complete Secondary	108(49.32)	109 (56.48)	1.12	0.53-2.36	
	Complete Tertiary	51 (23.29)	27 (13.99)	2.14	0.92-4.94	
	No formal education	15 (6.85)	17 (8.81)	Ref	-	
[c]Average household monthly income in Kenya shillings	5000-10000	79 (48.17)	39 (27.66)	2.09	1.12-3.85	
	10000-20000	33 (20.12)	34 (24.11)	Ref	-	
	20000-30000	16 (9.76)	9 (6.38)	1.83	0.71-4.72	
	30000-50000	13 (7.93)	35 (24.82)	0.38	0.17-0.84	
	50000-100000	11 (6.71)	16 (11.35)	0.71	0.28-1.75	0.0001
	>100000	0 (0)	2(1.42)	Omitted	-	
	Don't know	12 (7.32)	6 (4.26)	2.06	0.69-6.13	
NHIF uptake	No	153(69.86)	130(67.36)	Ref	-	
	Yes	66(30.14)	63 (32.64)	0.89	0.58-1.35	0.5844
[d]No of people in household	1-15	-	-	0.92	0.84 -1.00	0.0553

[e]Household breadwinner	Self	75 (34.25)	48 (24.87)	Ref	-	
	Spouse	142(64.84)	139(72.02)	0.65	0.42-1.00	
	Parent	2 (0.91)	5 (2.59)	0.256	0.04-1.37	
	Other	0 (0)	1(0.52)	Omitted	-	0.0620
[f]Tribes	Somali	65(29.82)	58(30.37)	Ref	-	
	Kikuyu	47(21.56)	38(19.90)	1.10	0.63-1.92	
	Kamba	24(11.01)	35(18.32)	0.61	0.32-1.14	
	Luhya	19(8.72)	19(9.95)	0.89	0.43-1.84	0.0147
	Luo	28(12.84)	9(4.71)	2.78	1.21-6.36	
	Mijikenda	3(1.38)	8(4.19)	0.33	0.08-1.32	
	Kisii	9(4.13)	3(1.57)	2.68	0.69-10.36	
	Others	23(10.55)	21(10.99)	0.98	0.49-1.94	
[g]Culture	Yes	1(0.46)	4(2.07)	0.22	0.02-1.95	0.1250
	No	218(99.54)	189(97.93)	Ref	-	
[h]Primary Decision maker	Self	75(34.25)	50(25.91)	Ref	-	
	Husband	142(64.84)	137(70.98)	0.69	0.45-1.06	0.1430

	Parents Person I reside with	2(0.91) 0(0.00)	4(2.07) 2(1.04)	0.33 Omitted	0.05-1.88 -	
Media influence	Yes No	30(13.70) 189(86.30)	29(15.03) 164(84.97)	0.90 Ref	0.51-1.55 -	0.7013
Facility of preference for vaccination	Government Private Faith-based Any	188(85.84) 19(8.68) 4(1.83) 8(3.65)	163(84.46) 26(13.47) 0(000) 4(2.07)	0.58 0.37 Omitted Ref	0.17-1.95 0.09-1.39 - -	0.2179
Requirement/advice from child's school to vaccinate	Yes No	108(50.00) 108(50.00)	94(48.70) 99(51.30)	1.05 Ref	0.71-1.55 -	0.7936
Thoughts on sex to vaccinate	Both Boys Girls	196(89.50) 3(1.37) 20(9.13)	179(92.75) 3(1.55) 11(5.70)	Ref 0.9132653 1.6605	- 0.18 - 4.58 0.77-3.56	0.4107

[a,b,c,d,e,f,g,h] *Factors added to the multivariable logistic model, p<0.20*

**OR Odds Ratio*

**VH + Presence of vaccine hesitancy*

**VH- Absence of vaccine hesitancy*

4.7.2 Results of the multivariable logistic regression (Table 5)

In the multivariable logistic regression analysis, at a 5% level of significance, only monthly income category and tribe were associated significantly with the odds of vaccine hesitancy (VH). As a group, the categorical variable income was a significant socioeconomic predictor of VH (p=0.0002). The monthly income categories associated with VH included 5000-10000 (P=0.028) and 30000-50000(p=0.008).

Controlling for the effects of tribe, households whose breadwinner earned below minimum wage i.e less than 10,000 Kenya shillings (Ksh) per month had increased odds of vaccine hesitancy while those earning above minimum wage had decreased odds of VH. Notably, compared to the parents who had an income per month of Ksh 10,000-20,000, those who had a monthly income of 5,000-10,000 had twice the odds of VH (OR=2.07, 95% CI[1.0835,3.9730]) while those who earned between 30,000-50,000 had 68% less odds of VH (OR=0.32, 95%CI[0.1359,0.7373]), controlling for the effect of tribe on VH.

Tribe was the only sociocultural factor that that had a significant association with VH (P=0.0265). Compared to the Somali tribe, only the tribes Kamba (p=0.011) and Luo (p=0.028) were found to be significant predictors of the odds of VH at a 5% significance level, controlling for the effect of monthly income category. Compared to a Somali, a Kamba had approximately 65% less odds of VH (OR=0.35, 95%CI [0.1575, 0.7887]) while a luo had roughly 4.4 times higher odds of VH (OR=4.44, 95%CI [1.1743, 16.7695]), controlling for effect of monthly income category.

Removing the non-significant variables from the multivariable model resulted in <30% change in the coefficient of the significant variables showing no confounding effect on the remaining variables. The multivariable model had a good fit (Hosmer-lemeshow p-value=0.9354).

Table 5: Multivariable logistic regression analysis socioeconomic and sociocultural drivers of vaccine hesitancy

Variable	Values	Outcome				
		VH+* **n (%)** **219 (53.16)**	**VH-*** **n (%)** **193 (46.84)**	**aOR***	**95% Confidence interval**	**LRT P-value**
Average household Monthly income in Kenya shillings	5000-10000	79 (48.17)	39 (27.66)	2.07	1.08-3.97	0.028
	10000-20000	33 (20.12)	34 (24.11)	Ref	-	-
	20000-30000	16 (9.76)	9 (6.38)	1.80	0.67-4.81	0.240
	30000-50000	13 (7.93)	35 (24.82)	0.32	0.13-0.73	0.008
	50000-100000	11 (6.71)	16 (11.35)	0.84	0.31-2.20	0.719
	>100000	0 (0)	2(1.42)	Omitted	-	-
	Don't know	12 (7.32)	6 (4.26)	2.89	0.92-9.01	0.067
Tribe (self declared)	Somali	65(29.82)	58(30.37)	Ref	-	-
	Kikuyu	47(21.56)	38(19.90)	0.68	0.32 -1.41	0.304
	Kamba	24(11.01)	35(18.32)	0.35	0.15-0.78	0.011
	Luhya	19(8.72)	19(9.95)	0.64	0.25-1.58	0.333
	Luo	28(12.84)	9(4.71)	4.44	1.17-16.76	0.028
	Mijikenda	3(1.38)	8(4.19)	0.38	0.08-1.74	0.211
	Kisii	9(4.13)	3(1.57)	1.26	0.29-5.41	0.755
	Others	23(10.55)	21(10.99)	0.96	0.40-2.30	0.932

*VH+ Vaccine hesitancy present *VH- Vaccine hesitancy absent

***aOR**Adjusted odds ratio

5 DISCUSSION

5.1 Introduction

This chapter deliberates the results of this study, notably the scope of vaccine hesitancy in Eastleigh North and South wards in Kamukunji, Nairobi County, the concerns surrounding childhood vaccination as depicted from the study and the economic and sociocultural drivers of vaccine hesitancy.

5.2 Vaccine hesitancy: Prevalence and parental attitude towards vaccination

Overall, parental vaccine hesitancy was present in slightly more than half (51.8%) of the study population. This shows that like in other areas across the world (Bertoncello et al., 2020; Dasgupta et al., 2018; Kijjambu, 2021; Marshall et al., 2021; Sabahelzain et al., 2021), VH is present in Kenya and could be plaguing the efforts by the government and other players to increase the uptake of childhood vaccination and decrease VPDs especially in response to outbreaks such as the measles and polio, both that have occurred in our study area within the last decade (International Federation of the Red Cross and Red Crescent, 2006; Ministry of Health, 2018).

Safety of the vaccinations was a concern to this study population just like it was in other studies globally. Roughly 18.68% (n=79) of the respondents stated that they did not trust the safety of vaccines and 36.88% (n=156) reporting that they did not trust the effectiveness of vaccines. Similarly, a cross-sectional survey on VH and its determinants done among Arab parents showed that 28% of them were concerned about the safety of the vaccines (Alsuwaidi et al., 2020) while a similar study done in Ireland in the year 2018 showed that up to 20% of the parents had similar concerns (Marshall et al., 2021). Additionally, according to a cross-sectional study on the determinants of measles vaccine hesitancy among Sudanese parents, 16.6% and 13% of them

respectively reported that they did not trust the effectiveness and safety of the vaccine (Sabahelzain et al., 2021). The WHO SAGE working group provides that factors contributing to VH can be summarized into a 3Cs model (Confidence, Convenience and Complacency) (WHO, 2014). In reference to this 3Cs model, findings from our study show that uncertainty in the safety and effectiveness of child vaccination by parents is the core of VH in this population. Compared to 'confidence', 'convenience' which is described by the SAGE working group as vaccine affordability and the willingness by a person to pay for the same (WHO, 2014) was an issue to a much smaller proportion of participants (2.60%, n=11).

Even if majority of the respondents believed that benefits of vaccination outweigh the risks, about ½ were still concerned about risks surrounding vaccination. Indeed, the fear of side-effects has been cited as a rationale for vaccine hesitancy by parents across many countries in the world (Alsuwaidi et al., 2020; Marshall et al., 2021; Sabahelzain et al., 2021). Fever was also reported as a concern by 37% of the respondents. In fact, from the study, fever was the most worrisome vaccination risk to the respondents (figure 4) pointing to a lack of awareness by parents and caregivers about the difference between side-effects such as fever which are not life-threatening and adverse effects which are life-threatening. The findings are similar to a study done in Uganda where caregivers were concerned about fever, convulsions and rash after vaccination of their children (Malande et al., 2019). Proper sensitization of caregivers on risks, benefits and side effects of vaccines can help to reduce hesitancy that may occur because of this safety concerns.

There was some level of complacency in our study population with almost ¼ of the respondents (23.57%, n=99) not believing that VPDs are serious conditions. While vaccine complacency has been demonstrated to be a concern in high income countries (HIC)s such as the US (Benin, Wisler-Scher, Colson, Shapiro, & Holmboe, 2006) perhaps because of their successful immunization

programs that have managed to reduce the burden of these diseases in their countries, findings of this study point towards suboptimal awareness or seriousness on VPDs even in populations like ours that are occasionally plagued with the same. In order to reduce VH, health-care providers need to enhance their efforts in improving awareness on VPDs.

More than half of the respondents (51.82%, n=214) found the vaccines given to children as being too many. In addition, a higher proportion (61.76% versus 34.92%) believed that it was better for multiple vaccines to be given as separate and not combined doses. Vaccine injections being too many has also been cited as a concern by 28% and 13% of parents according to the studies by Alsuwaidi et al.,2020 and Marshall et al., 2021 respectively. This underscores the need to provide education to parents and the community on mode of vaccine delivery and address their concerns.

As vaccination sites, 85.6% (n=362) of the respondents preferred government facilities, 10.64% (n=45) preferred private facilities while only 0.05% (n=4) preferred faith-based facilities and 3% (n=12) were indifferent. Almost 1/5 (18.3% n=77) of the respondents gave a positive history of being sent home because a vaccination was not available in a facility that they visited pointing towards vaccine stock outs as a potential vaccination barrier. Correspondingly, a study conducted in Uganda showed that care givers who went to a facility and did not get vaccines were unlikely to bring the child back for immunization (Malande et al., 2019). Vaccine stock outs especially in government facilities should also be acknowledged and addressed as a health system factor that could result in VH and missed vaccination opportunities. In the event that vaccine stocks are limited, government followed by private facilities should be prioritized in stocking as they seem to be the preferred vaccination sites for majority of parents.

5.3 Economic and sociocultural factors associated with VH

Monthly income category and ethnicity/tribe were the only factors that were significantly associated with the odds of VH in this study population.

This study showed that the odds of VH increased with decreasing monthly income, controlling for the effect of tribe. Unfortunately, majority of the respondents (38.69%, n=118) earned between Ksh 5000-10000 per month which is below the recommended minimal wages for workers residing in Kenya's Nairobi county (Supplement, 2022) and this increased their odds of having VH compared to those who earned Ksh 10000-20000 monthly. Compared to those who earned Ksh 10000-20000 per month, those who earned Ksh 5000-10000 had roughly twice while those who earned between Ksh 30000-50000ksh had approximately 1/3 the odds of VH, controlling for the effect of tribe. Findings from this study are comparable to those from a Chinese based study on VH among parents that revealed a statistically significant association between annual family income and VH (β= 1.64, 95% CI: 1.13-2.16) (Shen et al., 2022). Similarly, a US-based study reporting 25% of parents as being vaccine hesitant showed that the highest proportion of them (35.6%) came from households living below the poverty line (Nguyen et al., 2022).

These findings on association between parental income and vaccine hesitancy shows that if employers could strive to meet the required minimal wage for their employees, reducing VH would probably be one of the benefits that would ensue. Financial limitations are indeed a major barrier to childhood immunization especially where vaccines are paid for. Notably, the cost of vaccines was reported as a barrier to vaccination by 2.6% of the respondents in this study population and a bigger proportion (68.8%) were not enrolled into NHIF. There were similar findings in a multicounty study that showed that fees charged for immunizations create a barrier to vaccination (Olorunsaiye, Langhamer, Wallace, & Watkins, 2017) and children from poor backgrounds were

likely to not be immunized (Wiysonge, Uthman, Ndumbe, & Hussey, 2012). Furthermore, studies have shown that household income is an important contributor in the health seeking behavior of the household. Even where healthcare is provided free of charge, some costs such as transportation to clinics may be an obstacle to accessing the needed health services (Malande et al., 2019). Financial constraints in a household can be a factor in vaccine hesitancy (Wiysonge et al., 2012).

In this study population, ethnicity was also significantly associated with VH where a Kamba had 1/3 the odds of VH compared to a Somali and a Luo had roughly 4.4 times the odds of VH compared to a Somali, controlling for income category. Belief in alternative medicine such as herbal medicine could also be a care-giver related driver of VH (Adamu et al., 2021). Such beliefs and trust in herbal medicine could be intertwined with certain tribal or cultural beliefs. In Kenya, faith in herbal medicine has been shown to be present among the Luo (Johns, Kokwaro, & Ebi, 1990) and has even been reported as being used for treatment of measles by 12.6% of residents of Gucha subcounty subjected to a community based study on the utilization of herbal medicine (Ondicho, Ochora, Matu, & Mutai, 2015). Varying health seeking behavior between one community and another could contribute towards the variation in odds of VH among parents from different ethnicities. Indeed, a study on the contributing factors to health-seeking behavior of residents in Nairobi slums observed that the health-seeking behavior among Kamba women was better than that of Luo women (Taffa & Chepngeno, 2005). Therefore, the differences in health seeking behavior among Kamba and Luo communities may explain the variation in their odds of VH.

6 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Vaccine hesitancy was found to be present in > 1/2 of the study population (51%, n=219) and could be plaguing the efforts by the government and other players to increase the uptake of childhood vaccination and decrease VPDs. The greatest contributor of VH in this study population was lack of trust in the safety and effectiveness of the vaccines. Majority of the participants preferred seeking childhood vaccination from the government facilities compared to private and faith-based facilities.

Household income and belonging to the Kamba or Luo tribes were associated with Vaccine hesitancy. Notably there was no association between vaccine hesitancy and level of education, marital status or sex of the primary decision maker in the household.

6.2 Recommendations

Based on the findings from this study, the following are key recommendations that could help mitigate the burden of vaccine hesitancy among the residents of Kamukunji constituency in Nairobi County:

1. Health workers should conduct health education meetings with parents and care-givers attending the maternal and child health clinics focusing on the safety and efficacy of childhood vaccinations
2. The government and partners should prioritize on government facilities to ensure that childhood vaccines are fully stocked.

3. The government and interested donors should offer incentives such as cash handouts to parents/care-givers coming from low-income households who may hesitant to vaccinate their children due to either the cost of the vaccine or cost of accessing the health facilities
4. Researchers should conduct In-depth qualitative studies focusing on the Luo and Kamba communities in order to unfold any unique behavioral, social or cultural patterns they could have that could explain the association with vaccine hesitancy.
5. Adherence to wage guidelines as set by the government as this might reduce hesitancy to childhood vaccination among parents of low socioeconomic status.

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8 APPENDICES

8.1 APPENDIX I: INFORMED CONSENT FORM (English)

PARTICIPANT INFORMATION AND CONSENT FORM

ADULT CONSENT FOR ENROLLMENT IN THE STUDY

Title of Study: A CROSS-SECTIONAL STUDY OF BARRIERS TO IMMUNIZATION. A FOCUS ON VACCINE HESITANCY IN NAIROBI

Principal Investigator\and institutional affiliation: Kamweru Teresa Wangari. (Contacts 0721577050). University of Nairobi (UON), School of Public Health

Lead Supervisor: Dr Richard Ayah. Lecturer. University of Nairobi, School of Public health

Introduction

I would like to tell you about a study being conducted by the above-named researcher. The purpose of this consent form is to give you the information you will need to help you decide whether or not to be a participant in the study. Feel free to ask any questions about the purpose of the research, what happens if you participate in the study, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When we have answered all your questions to your satisfaction, you may decide to be in the study or not. This process is called 'informed consent'. Once you understand and agree to be in the study, I will request you to sign your name on this form. The general principles which apply to all participants in a medical research are as follows:

i) Your decision to participate is entirely voluntary
ii) You may withdraw from the study at any time without necessarily giving a reason for your withdrawal
iii) Refusal to participate in the research will not affect the services you are entitled to in any health facility. We will give you a copy of this form for your records.

May I continue? YES / NO

This study has been approved by The Kenyatta National Hospital-University of Nairobi Ethics and Research Committee Ref No. _____

WHAT IS THIS STUDY ABOUT?

The purpose of the interview is to assess the scope of vaccine hesitancy in Nairobi county and investigate the drivers of vaccine hesitancy among parents of children aged 12 months and below. Vaccine hesitancy is the delay in acceptance or refusal of vaccines despite availability of safe and effective vaccines. This includes, delaying vaccines, accepting vaccines but remaining uncertain about their use, accepting certain vaccines but not others as well as total refusal to vaccinate.

Participants in this research study will be asked questions about their knowledge and attitudes towards child vaccination as well their acceptance or rejection of the vaccines recommended for children aged 12 months and below by the Kenya Ministry of Health.

There will be approximately 423 participants in this study randomly chosen. We are asking for your consent to consider participating in this study.

WHAT WILL HAPPEN IF YOU DECIDE TO BE IN THIS RESEARCH STUDY?

If you agree to participate in this study, the following things will happen:

You will be interviewed by a trained interviewer in a private area where you feel comfortable answering questions. The interview will last approximately 25 minutes. The interview will cover topics such as age of your child, which vaccines he/she has received already, which ones have been refused or delayed and why, as well as your general knowledge about the recommended vaccines.

We will ask for a telephone number where we can contact you if necessary. If you agree to provide your contact information, it will be used only by people working for this study and will never be shared with others. The reasons why we may need to contact you include to confirm any information that may be unclear or that may be incomplete.

ARE THERE ANY RISKS, HARMS DISCOMFORTS ASSOCIATED WITH THIS STUDY?

Medical research has the potential to introduce psychological, social, emotional and physical risks. One potential risk of being in this study is loss of privacy. However, we will keep

everything you tell us as confidential as possible. We will use a code number to identify you in a password-protected computer database and will keep all of our paper records in a locked file cabinet. However, no system of protecting your confidentiality can be absolutely secure, so it is still possible that someone could find out you were in this study and could find out information about you.

Also, answering questions in the interview may be uncomfortable for you. If there are any questions you do not want to answer, you can skip them. You have the right to refuse the interview or any questions asked during the interview.

Additionally, all study staff and interviewers are professionals with special training in these examinations/interviews.

ARE THERE ANY BENEFITS BEING IN THIS STUDY?

You may benefit by receiving free health information. Where necessary we will refer you to a health care facility for care and support. Also, the information you provide will help us better understand the acceptance and uptake of vaccines in Nairobi. This information is a contribution to science and may inform interventions related to encouraging timely vaccine uptake

WILL BEING IN THIS STUDY COST YOU ANYTHING?

There will be no monetary cost to you for participating in this study. We only ask for your time and honest information.

WHAT IF YOU HAVE QUESTIONS IN FUTURE?

If you have further questions or concerns about participating in this study, please call or send a text message to the study staff at the number provided at the bottom of this page.

For more information about your rights as a research participant you may contact the Secretary/Chairperson, Kenyatta National Hospital-University of Nairobi Ethics and Research Committee Telephone No. 2726300 Ext. 44102 email uonknh_erc@uonbi.ac.ke.

The study staff will pay you back for your charges to these numbers if the call is for study-related communication.

WHAT ARE YOUR OTHER CHOICES?

Your decision to participate in research is voluntary. You are free to decline participation in the study and you can withdraw from the study at any time without injustice or loss of any benefits**.**

8.2 APPENDIX II: CONSENT FORM (STATEMENT OF CONSENT)

Participant's statement

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counselor. I have had my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I may choose to withdraw at any time. I freely agree to participate in this research study.

I understand that all efforts will be made to keep information regarding my personal identity confidential.

By signing this consent form, I have not given up any of the legal rights that I have as a participant in a research study.

I agree to participate in this research study: Yes ------ No -----

I agree to provide contact information for follow-up: Yes ---- No ----

Participant's printed name:

_____

Participant signature / Thumb stamp _____ Date _____

Researcher's statement

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has willingly and freely given his/her consent.

Researcher's Name: _____ Date: _____

Signature _____

Witness Printed Name (If witness is necessary, A witness is a person mutually acceptable to both the researcher and participant)

Name _____Contact information _____

Signature /Thumb stamp: _____ Date;_____

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

8.3 APPENDIX III: INFORMED CONSENT FORM (Kiswahili)

MAELEZO KUHUSU MSHIRIKI PAMOJA NA FOMU YA IDHINI YA USHIRIKI

IDHINI YA MTU MZIMA YA KUSHIRIKI KATIKA UTAFITI

Mada ya Utafiti: Kuchunguza wigo na sababu za kusita kwa wazazi wa watoto wa miezi 12 kuwapeleka watoto kupokea chanjo katika kata ya Nairobi.

Mtafiti mkuu \ na ushirika wa kitaasisi: Kamweru Teresa Wangari. (Nambari ya Simu 0721577050). Chuo Kikuu cha Nairobi (UON), Shule ya Afya ya Umma

Msimamizi Mkuu: Daktari Richard Ayah. Mhadhiri. Chuo Kikuu cha Nairobi, Shule ya Afya ya Umma.

UTANGULIZI

Ningependa kukueleza kuhusu utafiti unaofanywa na mtafiti aliyetajwa hapo juu. Madhumuni ya fomu hii ya idhini ni kukupa habari unayohitaji ili kukusaidia katika kuamua iwapo utashiriki utafiti au la. Jihisi huru kuuliza maswali yoyote kuhusiana na madhumuni ya utafiti huu au kuhusu kitakachotokea iwapo utaamua kushiriki, hatari na faida zinazowezekana, haki yako kama mjitolea, na jambo lolote kuhusu utafiti au fomu hii ambalo halijawekwa wazi. Utakaporidhika na majibu yetu kwa maswali yako , unaweza kuamua iwapo utashiriki katika utafiti au la. Utaratibu huu unaitwa 'ridhaa makinifu'. Mara tu utakapokuwa ume elewa na kukubali kushirki katika utafiti, nitakuomba utie saini na jina lako kwenye fomu hii. Kanuni za jumla zinazotumika kwa washiriki wote katika utafiti wa kimatibabu ni kama zifuatavyo:

i) Uamuzi wako wa kushiriki ni wa hiari kabisa
ii) Unaweza kusitisha utafiti wakati wowote bila kuhitajika kutoa sababu ya kujiondoa kwako
iii) Kukataa kwako kushiriki katika utafiti hakuathiri huduma unayostahili katika kituo chochote cha afya. Tutakupatia nakala ya fomu hii ili uhifadhi katika rekodi zako.

Naweza kuendelea? NDIO/LA

Utafiti huu umepitishwa na Kamati ya Maadili ya Utafiti ya Hospitali ya Kitaifa ya Kenyatta-Chuo Kikuu cha Nairobi; Nambari ya kumbukumbu:_____

_____

UTAFITI HUU NI KUHUSU NINI?

Madhumuni ya mahojiano haya ni kuchunguza wigo na sababu za kusita kwa wazazi wa watoto wa miezi 12 kwenda chini kuwapeleka watoto kupokea chanjo katika kata ya Nairobi. Kwa muktadha huu, kusita kupokea chanjo ina maana ya kucheleweshe chanjo au kukataa kabisa chanjo zilizo pendekezwa na Wizara ya Afya ya Kenya, licha ya kuwepo kwa chanjo salama na bora. Hii ni pamoja na kukubali chanjo lakini kubaki bila uhakika dhidi ya ubora wake, kukubali baadhi ya chanjo zilizopendekezwa au kususia chanjo zote kwa ujumla.

Washiriki katika utafiti huu wataulizwa maswali juu ya uelewa na fikra zao kuhusu chanjo kwa watoto na pia juu ya ukubalifu au makataa yao kwa chanjo zilizopendekezwa na Wizara ya Afya ya Kenya kwa watoto wa miezi 12 kwenda chini.

Kutakuwa na washiriki takriban 423 katika utafiti huu waliochaguliwa kinasibu. Tunaomba idhini yako kushiriki katika utafiti huu.

ITAKUWAJE UKIAMUA KUSHIRIKI KATIKA UTAFITI HUU?

Ikiwa unakubali kushiriki katika utafiti huu, mambo yafuatayo yatatokea:

Utahojiwa na mtafiti wetu katika eneo la faragha ambapo unajihisi huru kujibu maswali. Mahojiano yatachukua muda wa takriban dakika 25. Mahojiano yataangazia mada kama vile umri wa mtoto wako, chanjo ambazo mtoto wako tayari amepokea, chanjo ambazo zimekataliwa au kucheleweshwa pamoja na sababu ya maamuzi yako. Pia utahojiwa dhidi ya ufahamu wako kwa jumla kuhusu chanjo zilizopendekezwa.

Tutakuomba nambari ya simu ambapo tunaweza kuwasiliana nawe ikihitajika. Taarifa yako ya mawasiliano itatumiwa tu na watu wanaofanya kazi katika utafiti huu na kamwe haitatolewa kwa yeyote mwingine. Sababu ambazo tunaweza kuhitaji kuwasiliana nawe ni

pamoja na kudhibitisha habari zozote ambazo huenda zisieleweke vizuri au ambazo labda hazijakamilika.

JE KUNA HATARI, ATHARI AU USUMBUFU WOWOTE UNAOHUSIANA NA UTAFITI HUU?

Utafiti wa kimatibabu unaweza kulete athari za kisaikolojia, kijamii, kihisia au za kimwili. Hatari moja inayoweza kutokea kwa kushiriki utafiti huu ni uwezekano wa faragha yako kuingiliwa. Hata hivyo, tutajaribu iwezekanavyo kuyaweka yote utakayoyasema kuwa siri. Tutatumia lugha fiche iliyowekwa namba ya siri ili kuto kutambulisha katika hifadhi ya kompyuta iliyolindwa na nywila na tutaweka rekodi zetu zote za kimaandishi katika faili kwenye rafu iliyofungwa. Hata hivyo, hakuna mfumo wa kulinda usiri salama kabisa.Hata baada ya juhudi zote, bado kuna uwezekano wa ziada mtu fulani kugundua kuwa ulikuwa kwenye utafiti huu au mtu aweze kupata habari juu yako.

Ikiwa kuna maswali ambayo hutaki kujibu, unaweza kuyapita. Una haki ya kukataa mahojiano au maswali yoyote yatakayo ulizwa wakati wa mahojiano. Kwa kuongezea, wafanyikazi wote wa uatfiti huu na mahojiano haya ni wataalamu waliofundishwa kikamilifu na walio na stadi maalum katika nyanja hii.

JE! KUNA FAIDA YOYOTE ITAKAYOTOKANA KWA KUSHIRIKI KATIKA UTAFITI HUU?

Unaweza kufaidika kwa kupokea habari za kiafya bila malipo. Ikiwa itahitajika,tutakuelekeza kwenye hospitali ili upate utunzaji na msaada. Pia, habari unayotoa itatusaidia kuelewa vyema ukubalifu na matumizi ya chanjo jijini Nairobi. Habari hii ni mchango kwa sayansi na inaweza kuarifu hatua zinazohusiana na kuhamasisha utafutaji wa chanjo kwa wakati unaofaa.

JE! KUSHIRIKI KATIKA UTAFITI HUU KUTAKUGHARIMU CHOCHOTE?

Hakutakuwa na gharama yoyote ya kifedha kwako kwa kushiriki katika utafiti huu. Tunachohitaji kutoka kwako ni wakati wako na habari za kuaminika.

VIPI IKIWA UTAKUWA NA MASWALI BAADAYE?

Iwapo unayo maswali zaidi au wasiwasi juu ya kushiriki katika utafiti huu, tafadhali piga simu au tuma ujumbe mfupi kwa wafanyikazi wa utafiti kupitia nambari ya simu iliyotolewa kwa nakala hii.

Kwa habari zaidi kuhusu haki yako kama mshiriki wa utafiti unaweza kuwasiliana na Katibu / Mwenyekiti wa Kamati ya Maadili ya Utafiti, Hospitali ya Kitaifa ya Kenyatta-Chuo Kikuu cha Nairobi kupitia Nambari ya simu: 2726300 Ext. 44102 au Barua pepe: uonknh_erc@uonbi.ac.ke

Wafanyikazi wa utafiti watakurudishia fedha zozote ambazo huenda ukatumia katika kupiga simu hizi kwa madhumuni ya utafiti huu. Uamuzi wako wa kushiriki katika utafiti ni wa hiari. Uko huru kukataa kushiriki katika utafiti na unaweza kusitisha utafiti wakati wowote bila madhara yoyote.

8.4 APPENDIX IV: KIAMBATISHO CHA FOMU YA IDHINI (KAULI YA IDHINI)

KAULI YA MSHIRIKI

Nimesoma fomu hii ya idhini au nimesomewa habari iliyomo. Nimepata nafasi ya kujadili utafiti huu na mshauri wa utafiti. Nimepata majibu ya maswali yangu katika lugha ninayoelewa. Hatari na faida zimefafanuliwa kwangu. Ninaelewa kuwa ushiriki wangu katika utafiti huu ni wa hiari na kwamba naweza kuchagua kuusitisha wakati wowote. Nakubali kwa hiari kushiriki katika utafiti huu.

Ninaelewa kuwa juhudi zote zitafanywa kuweka siri habari zangu za kibinafsi.

Kwa kutia saini fomu hii ya idhini, sijatoa kwa mtu yeyote haki yangu ya kisheria kama mshiriki katika uchunguzi wa kitafiti.

Ninakubali kushiriki katika utafiti huu: Ndio ------ La -----

Ninakubali kutoa nambari yangu ya mawasiliano kwa matumizi ya utafiti: Ndio ---- La ----

Jina la mshiriki lililochapishwa:

_____

Saini ya mshiriki / Alama ya kidole _____ Tarehe _____

Kauli ya mtafiti

Mimi, niliye tia saini hapa chini, nimeelezea kikamilifu maelezo muhimu ya utafiti huu kwa mshiriki aliyetajwa na ninaamini kwamba mshiriki ameelewa na ametoa ridhaa yake kwa uhuru na kwa hiari yake.

Jina la mtafiti: _____ Tarehe: _____

Saini _____

Jina lililochapishwa la Shahidi (Ikiwa ushahidi unahitajika, Shahidi ni mtu anayekubalika kwa mtafiti na mshiriki)

Jina _____ taarifa ya mawasiliano _____

Saini / Alama ya kidole: _____ Tarehe; _____

Saini ya mshiriki _____ Tarehe _____

Saini ya Msimamizi wa utafiti _____ Tarehe _____

8.5 APPENDIX V: INFORMED CONSENT FORM (Kisomali)

WARQADDA KA-QEEYBQAADASHADA CILMIBAARISTA

OGOLAANSHIYAHA KA-QEEYBQAADASHADA CILMIBAARISTA

Cinwaanka Cilmibaarista: Wax laga ogaado baaxadda aay gaarsiisantahay in waalidiinta caruurta da'dooda tahay 12 bilood iyo ka yar ee ku nool magaalada Nairobi inaay baaqsadaan talaalka

Madaxa Su'aala weeydiinta/Jihada qaadeeysa: Kamweru Teresa Wangari. (0721577050). Jaamacadda Nairobi, Kulliyadda Caafimaadka.

Kormeeraha Guud: Dr Richard Ayah. Lecturer. Jaamacadda Nairobi, Kulliyadda Caafimaadka.

Horudhac

Waxaan rabnaa inaan kugu wargalino daraasad cilmi baaris oo uu qaadayo cilmi-baaraha kor ku xusan. Ujeeddada warqad heshiiseedkan ayaa ah inaad hesho wixii xog ah oo aad u baahantahay si aad u go'aansato inaad ka qeeybqaadaneeyso cilmibaaristan iyo in kale. Waxaad xor u tahay inaad na weeydiiso Su'aal kasta oo kusaabsan ujeedka cilmibaaristan , waxa dhici kara hadii aad ka qeeybqaadato , khasaaraha iyo faaiidada la filan karo , xuquuqda mutadawacnimo iyo wax walba oo Kusaabsan cilmibaaristan iyo hadii ay jiraan waxan cadeeyn oo ku xusan warqaddan heshiiska ah waad na weeydiin kartaa. Markii aan kaa qancinno su'aalaha aad qabto waxaad go'aansan kartaa inad ka qeeybqaadato cilmibaarista iyo in aadan ka qeeybqaadanin , waxaan kaa codsaneeynaa inaad saxiixdo warqaddan.

Ka qeeybqaatayaasha cilmi baarista caafimaad waxay leeyihiin xeerar guud waana sida tan:

i. Go'aankaaga ka qeeybqaadasho gabi ahaanba waa mid ku dhisan mutadawacnimo oo aan waxba lugu qaadaneeynin.
ii. Waad ka noqon kartaa ka qeeybqaadashada markasta lagaamana dalbanayo inaad sheegto sababaha aad uga noqotay go'aanka.
iii. Hadii aad diiddo ka qeeybqaadashada cilmibaarista caafimaad ma saameeyneeyso adeegyada aad ka hesho goobaha caafimaad. Ogoowna ku siineeynaa nuqul kamida warqaddan.

Masii wadi karaa? HAA / MAYA
Cilmibaaristan waxaa meel mariyay Isbitaalka Qaran ee Kenyatta – Guddiga Anshaxa iyo Cilmi -baarista ee Jaamacadda Nairobi Ref No.....

MAXAY KU SAABSANTAHAY DARAASADDAN?

Ujeeddada Su'aala weeydiintan ayaa ah in wax laga ogaado baaxadda aay gaarsiisantahay in waalidiinta caruurta da'dooda tahay 12 bilood iyo ka yar ee ku nool magaalada Nairobi inaay baaqsadaan talaalka. Waxaa kaloo looga dan leeyahay in la helo sababaha dhaliyay in waalidiintaas ay ka baaqsadaan talaalkaas , ama ka dibdhacaan inay aqbalaan talaalka amaba ay diidaan ayadoo uu jiro talaal wax tar leh. Ka baaqsashada talaalka waxa kamida : in la dib dhigo aqbalaadda talaal laisku halleyn karo oo kaliya laakiin la diido talaalka aan lugu kalsooneeyn amaba la diido talaal oo dhan.

Ka qeeybqaatayaasha cilmibaaristan waxaa la weeydiin doonaa waxa aay ka ogyihiin iyo aragtidooda ku aaddan talaalka aay Wasaaradda Caafimaadka Dalkan Kenya ku talisay inay qaataan caruurta jirta 12 bilood iyo ka yar.

Waxaa jiri doona ku dhawaad 423 qof oo lugu sameeyn doono cilmibaaristan kuwaasoo loo soo xushay si an habeeysneeyn. Waxaan kaa codsaneeynaa inaad tix galiso ka qeeybqaadashadaada cilmibaaristan.

MAXAA DHACAYA HADII AAD KA QEEYBQAADATO CILMI-BAARISTAN?

Hadii aad ka qeeybqaadato daraasaddan waxaa dhici doona sidan:
Waxaa Su'aala kuweeydiin doona qof loo tababaray kuguna weeydiin doona meel gaar ah oo aad ku dareemeyso inaad Su'aalaha uga jawaabi karto si xor ah. Suaalaha waxay soconayaan qiyaastii 20 daqiiqo . Suaalaha kusaabsanaan doonaan arrimo dhoowr ah oo ay kamid yihiin da'da ilmahaaga yar, talaalka uu qaatay, talaalka la diiday ama laga dib dhacay iyo sababka dhaliyay arimahaas, waxa aad ka ogtahay si guud talaalaha lasoo jeediyay qaadashadooda.
Waxaan ku weeydiin doonaa taleefan aan kaala soo xiriirno hadii luguu baahdo , cidda kaliya ee kula soo xiriiri doona waa kooxda cilmibaarista qaadeeysa cid kalana lambarkaaga lama

siinayo. Sababka aan lambarka taleefanka kaaga qadeeyno waa inaan did kusoo weeydiino xogta aan kaa qaadnay hadii aanay cadeeyn ama kaa dhameeystirano wixii kala dhiman.

MA JIRAA WAX KHATAR, WAXYEELLO AMA WALWAL LA XIRIIRA CILMIBAARISTAN?

Cilmibaarista caafimaad waxay leedahay suurtagalnimada inaay keento waxyeello maskaxeed mid bulsho mid dareen iyo waliba mid xaga jirka ah intaba. Mid kamida waxyeellada laga filan karo cilmibaaristan ayaa ah intaad bixiso sirta kugu saabsan ee kuu gaarka ah. Haseyeeshee, waxan ku dadaali doonnaa sirtaada inayna bixin waxaad noo sheegtana uu qarsoonaado. Xogtaada waxaan ku keeydin doonnaa kumbuyuutar ku xiran lambar sireed wixii warqadana waxaan ku keeydin doonnaa khaanad qufulan. Ayadoo aan sidaa u dadaaleeyno hadana waay dhici kartaa in qof uun aay u suurta gasho inuu wax ka ogaado Xogtaada an keeydin doonno.

Sidoo kale waxaa suurtagal ah qaar kamida su'aalaha in aadan jecleeysanin ka jawaabistooda. Hadii aay sidaasi dhacdo waad ka boodi kartaa su'aalaha qaarkood. Xaq ayaad u leedahay inaadan ka jawaabin su'aalaha qaarkood ama dhamaantood hadaadan jecleeyn ka jawaabistooda.
Waxaa intaa dheer, dhamaan kooxda cilmibaarista qaadeeyso iyo kuwa su'aalaha kuweeydiinaya waa dad si wanaagsan loogu taba-baray shaqadan.

MAXAA FAAIIDO IIGU JIRA CILMI-BAARISTAN INAN KAMID NOQDO?

Waxaad ka faaiidi kartaa inaad hesho xog caafimaad oo bilaash ah. Hadii aay lagama maarmaan noqotana waxaan kuu tilmaami doonnaa goobo caafimaad oo ku wanaagsan daryeelka. Sidoo kale xogta aad na siiso waxay nugu caawin doontaa inaan fahanno aqbalaadda iyo isticmaalka talaalka gudaha Nairobi. Xogtan waxay wax ku biirineeysaa cilmiga Caafimaadka waxaana suurtagal ah inay gacan ka geeysato soo fara-galin la xiriirta dhiiragalinta isticmaalka talaalka si haboon.

MAXAA KUUGU FADHIDAA CILMIBAARISTAN?

Majiro wax qiima lacageed oo kaaga baxaya ka qeeybqaadashada daraasaddan. Kaliya waxaan kaa codsaneeynaa waqtigaaga iyo daacadnimada jawaabahaaga.

KA WARRAN HADII AAD SU'AALA QABTO MUSTAQBALKA?

Hadii aad qabto Su'aala dheeri ah oo ku saabsan ka qeeybqaadashada cilmibaaristan Fadlan la xiriir ama udir fariin qoraaleed kooxda cilmibaarista uguna dir lamabarka ku qoran dhamnaadka boggan.

Wixii xog dheeraad ah oo ku saabsan xuquuqdaada ka qeeybqaadashada cilmibaaristan waxaad la xiriirtaa Xoghayaha ama Madaxa Isbitalka Kenyatta National Hospital-Guddiga Anshaxa iyo Cilmibaarista Jaamacadda Nairobi: 2726300 Ext.44102 Email uonknh_erc@uonbi.ac.ke

Kooxda daraasaddan ayaa kuu magdhabi doonta wixii qarash ah ee kaa galay wicitaanka ku saabsan daraasadan cilmibaaris arimaheeda.

MAXAA KALOO KUU FURAN?

Go'aankaaga ah inaad ka qeeybqaadato cilmibaaris waa mid ku dhisan mutadawacnimo oo aan waxba lugu heleeynin. Waxaad xor u tahay inaadan aqbalin. Hadaad aqbashana waxaa kuu furan inaad ka laabato marwalba ayadoo ayna jirin wax dhib ah ama wax nafci ah oo aad ku weyneeyso toona.

8.6 APPENDIX VI: CONSENT FORM (STATEMENT OF CONSENT - Kisomali)

LIFAAQA 2AAD EE WARQADDA HESHIISKA (CADEEYN OGOLAANSHO)

War bixinta ka qeeybqaataha

Warqaddan waan akhriyay xigtana waa la'ii akhriyay. Waxaan fursad u helay la taliye dhanka daraasaadka ah inan kala doodo daraasaddan cilmibaaris. Suaalaheeygana dhamaan waxaa looga jawaabay luuqad aan fahmi karo. Wixii faaido iyo khasaarana waa la ii sharxay.

Waan ogahay ka qeeybqaadashadeeyda inay tahay mid ku dhisan mutadawacnimo oo an waxba ku qaadaneeynin markii aan doonana aan ka laaban karo. Waxaan si ku tala gal ah u aqbalayaa inan ka qeeybqaato daraasaddan cilmibaaris.

Waxaan ogahay in dadaal lugu bixin doono xafididda sirta iyo xogaha ii gaarka ah ee aan bixiyay.

Saxiixa aan saxiixayo Warqaddan ogolaansho kama tanaasulin dhammaan xuquuqdeeyda sharciga ah oo aan leeyahay ka ka qeeybqaate daraasad cilmibaaris ahaan.

Waan aqbalay inaan ka qeeybqaato cilmibaaristan: HAA.....MAYA.....

Waan aqbalay inaan bixiyo lambarkeeyga taleefanka oo laigala soo xiriiro wixii xog loo baahdo: HAA..... MAYA.....

Magaca ka qeeybqaataha: .....

Saxiixa/sawirka suulka: .....

Taariikhda: .....

Warbixinta Cilmibaaraha

Anigoo ah shakhsiga hoos ku saxiixan waxaan ka qeybqaataha kor ku xusan si faahfaahsan ugu sharxay wax kasta oo ku saabsan cilmibaaristan wuxuuna si iskiisa ah u ogolaaday inuu ka qeeybqaato.

Magaca Cilmibaaraha: ..... Taariikhda: .....

Saxiixa: .....

Hadii uu markhaati lagama maarmaan noqdo waa inuu ahaadaa qof aay isla ogolyihiin Cilmibaaraha iyo Ka-qerybqaataha.

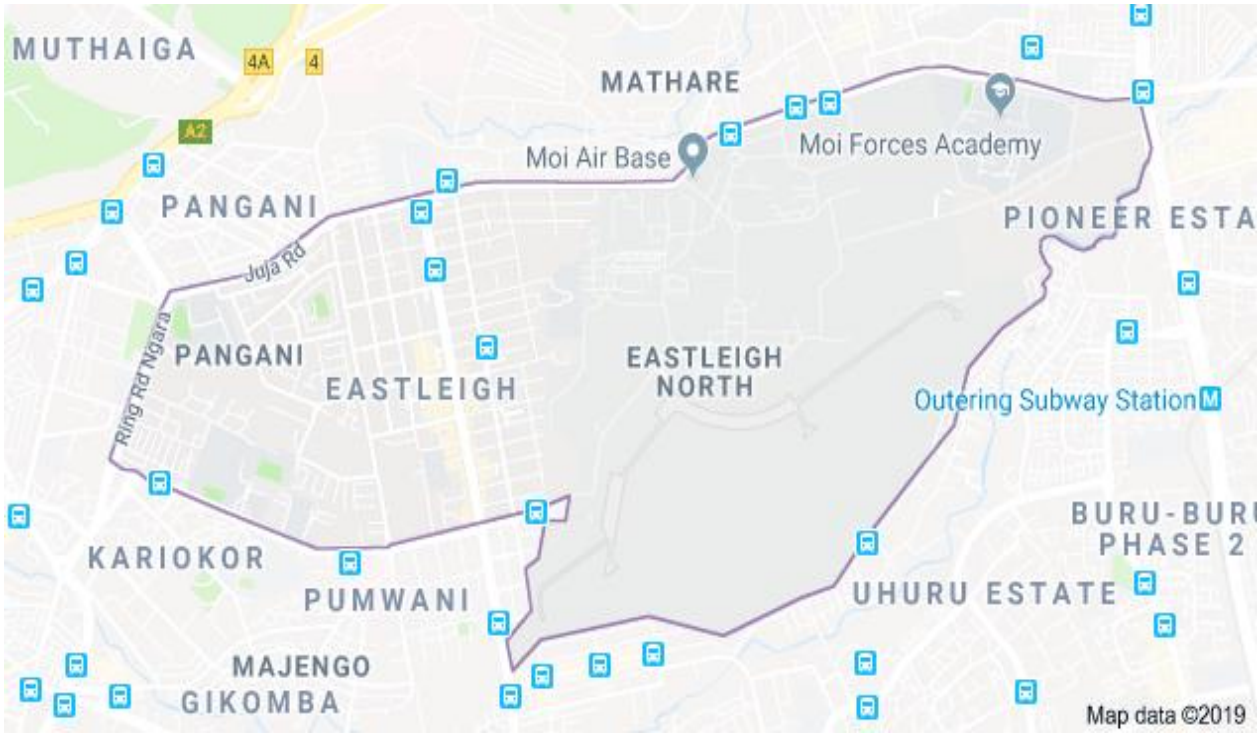
Magaca: ..... lambarka taleefanka: .....

Saxiixa/sawirka suulka: ..... Tariikhda: .....

Saxiixa Ka-qerybqaataha: ..... Tariikhda: .....

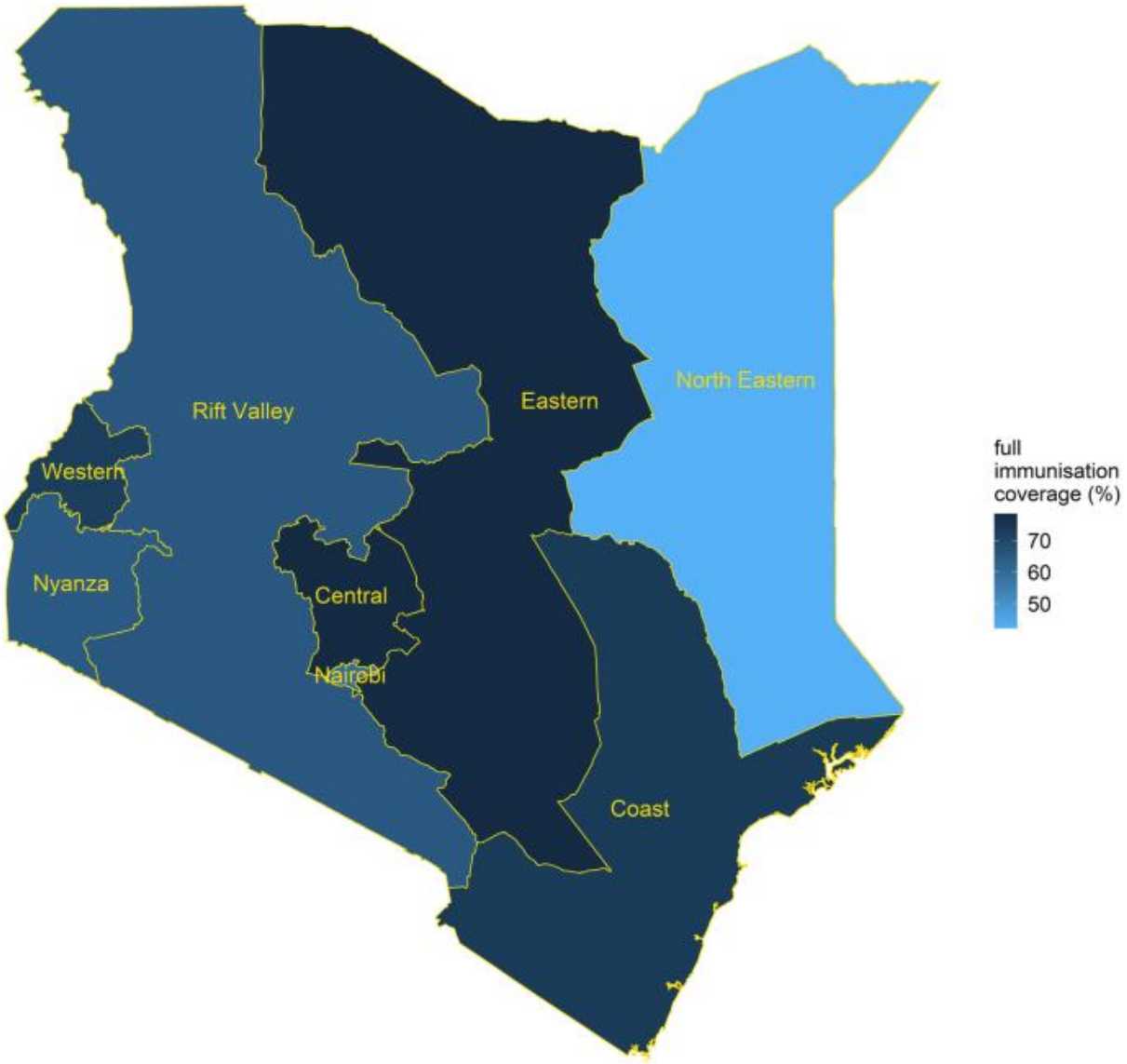
Saxiixa Cilmibaaraha: ..... Tariikhda: .....

8.7 APPENDIX VII: The Study Site Map



Adopted from: Map Data (2019).

8.8 APPENDIX VIII: Kenya Immunisation Coverage, 2016



Source: UNICEF (2018) Situation Analysis of Children and Women in Kenya 2017, UNICEF, Nairobi, Kenya.

8.9 APPENDIX IX: Questionnaire

Vaccine Hesitancy questionnaire

Introduction

Hello, my name is_____from the University of Nairobi, School of Public Health. We are conducting a survey to better understand the scope of vaccine hesitancy in Nairobi county and explore the drivers of vaccine hesitancy among parents of children aged 12 months and below.

Vaccine hesitancy is the delay in acceptance or refusal of vaccines despite availability of safe and effective vaccines. This includes, delaying vaccines, accepting vaccines but remaining uncertain about their use, accepting certain vaccines but not others and total refusal to vaccinate. Specifically, we will ask questions about your knowledge and attitudes towards child vaccination as well your acceptance or rejection of childhood vaccines recommended by the Kenya Ministry of Health.

We will begin by going through our informed consent. (The research assistant to take the participant through the informed consent form and obtain signoff as appropriate.)

Questionnaire

Q1) STUDY ID: _____ **Q2) Today's Date:**

___/___ /_____ (dd/mm/yyyy)

Q3) Enrollment location:

☐ Eastleigh North ☐ Eastleigh South

Q4) Demographics:

Q4-a) Sex: ☐ Male ☐ Female

Q4-b1) Date of birth ___/___/____ or Q5-b2) Age ……

(dd/mm/yyyy)

Q4-c) Marital status: ☐ Single ☐ Married ☐ Divorced ☐ Widowed ☐Separated

Q5) Tribe:

☐ Luo ☐ Luhya ☐ Kikuyu ☐ Kamba ☐ Miji Kenda ☐ Somali ☐ Kalenjin

☐Other (Indicate which one) ----------

☐Refused

SOCIO-ECONOMIC STATUS:

Q6) Highest education educational level

☐ No formal education

☐ Incomplete Primary education

☐ Complete Primary education

☐ Incomplete Secondary education

☐ Complete Secondary education

☐ Tertiary education

Q7) **What is NHIF? (Probe if he/she knows/heard)**

☐ National Hospital Insurance Fund

☐ Don't Know

(If NHIF), Do you have NHIF?

☐ Yes

☐ No

If Yes, when did you last pay? ____

WORK HISTORY AND BENEFITS

Now I would like to ask you some questions about any work that you may be doing now or have done in the past. As you know, some people take jobs for which they are paid in cash or kind. Other people sell things, have a small business or work on the family farm or family business.

Q8-a) Are you currently working or doing any of these activities (not including housework).

☐ Yes ☐ No

Q8-b) (Currently working) Now I will ask you about your current work. Which one of the following best describes your current work?

☐ Government employee	☐ Homemaker
☐ Non-government employee	☐ Retired
☐ Self-employed – Business	☐ Unemployed (able to work)
☐ Self-employed – Agriculture	☐ Unemployed (unable to work)
☐ Non-paid - Volunteer work	☐ Refused
☐ Student	☐ Casual Laborer

Q8-c) If NO, when was the last time you were engaged in any work or an income generating activity?

☐ Years: ____ ☐ Months: ____ ☐ Weeks: ____ ☐ Never

Q8-d) Now I will ask you some questions about your most recent work. Which one of the following best describes your past work?

☐ Government employee	☐ Non-government employee	
☐ Self-employed – Business	☐ Self-employed – Agriculture	
☐ Non-paid – Volunteer work	☐ Homemaker	
☐ Unemployed (able to work)	☐ Retired	
☐ Unemployed (unable to work)	☐ Refused	
☐ Casual Labourer		

Q9-a) Who is the breadwinner of your household?

☐ Self ☐ Spouse ☐ Parent ☐ Other

Q9-b) In the past year, what was the average earning of the household?

☐ Per week: _____ ☐ Per month: _____ ☐ Per year: _____

☐ Don't know

Q9-c) If you do not know, which of the following categories (in Ksh) do you think is closest? (per month)

☐ 5,000-10,000 ☐ 10,001-20,000 ☐ 20,001-30,000 ☐ 30,001-50,000

☐ 50,001-100,000 ☐ >100,000

Q9-d) How many people including yourself live in your household? _____

Q9-e) How many of the above are 18 years or above? _____

Q10 Who is the head of your family?

Myself [ ] My Husband [ ]

The person I'm leaving with [ ] ----------

Describe (Mother/Father, In Law, etc.)

Q10-a) Who often makes decisions concerning the welfare of the family?

Myself [ ] My Husband [ ] The person I'm leaving with [ ]

Q10-b) Have you or the person making the decision refused the the child (ren) in the household to receive a vaccine? Yes [ ] ☐ No

Q10-c) If Yes above, what was the main reason for resistance?

i. Information about the vaccine was not clear /Not available [ ]

Explain briefly ----------

ii. Negative experience with the vaccine previously [ ]

Explain briefly ----------

iii. Negative experience in a previous encounter in a health facility [ ]

Explain briefly----------

iv. Our culture forbids [ ]

v. Our religion forbids [ ]

vi. Forbidden by the head of the family [ ]

vii. Did not just want to participate [ ]

Q11) When you are unwell, where do you go for treatment?

☐ Dispensary ☐ Health Centre ☐ County Hospital ☐ Private Hospital/Clinic ☐ Herbalist ☐ Mission Hospital ☐ Private Chemist ☐ Spiritual Healer

☐ Sub-county hospital ☐ Laboratory ☐ National Referral hospital

Contextual Influences

Q12-a) Have reports you heard/read in the media /social media made you reconsider the choice to have your child vaccinated?

☐ Yes ☐ No

Briefly Explain ----------

Q12-b) What do you consider more important? Vaccination of boys or vaccination of girls?

☐ Boys ☐ Girls ☐ Both equally important ☐ None is important

Q12-c) Do you trust available vaccines to be safe? ☐ Yes ☐ No

Briefly Explain----------

Q12-d) Do you trust available vaccines to be effective? ☐ Yes ☐ No

Briefly Explain----------

Q12-e) Has your lifestyle e.g. Nature of work, travel, social group etc ever prevented you from receiving a vaccination for your child(ren)

☐ Yes ☐ No

Briefly Explain----------

Q13-a) Does your child's daycare/school require/advice to have your children vaccinated?

☐ Yes ☐ No

Q13-b) Do you agree with them? ☐ Yes ☐ No

Briefly Explain----------

Q13-c) Are you worried that some parents in your community are delaying or refusing vaccines, putting your child at risk for these diseases? ☐ Yes ☐ No

Vaccine/ Vaccination specific issues

Q-14-a) Does your personal philosophy, culture or religion recommend against (a certain) vaccination?

☐ Yes ☐ No

Q-14-b) If yes which one is forbidden/all vaccines? ----------

Q-14-c) Why is it forbidden? ----------

Q-15-a) Which vaccination do you prefer for your child?

i. The free of charge vaccines provided at the local health care facility ☐

Why? ----------

ii. The ones you need to pay for yourself? ☐

Why? ----------

iii. It does not matter whether it is provided free or I have to pay ☐

Why? ----------

Q-15-b) Have you ever refused/delayed a vaccination for your child because of the cost of the vaccine despite feeling that the vaccine is important for your child?

☐ Yes ☐ No

Q-15-c) Have you refused a vaccination because of the mode of vaccine delivery? (Oral, Injection, etc.)

☐ Yes ☐ No

Briefly explain----------

Q16) Are there vaccines that are difficult for you to get because of the schedule?

☐ Yes ☐ No

Briefly explain----------

Q17) Where would you prefer to receive a vaccine for your child: (Indicate the option that is most preferable)

a) A Government health facility ☐
b) A private health facility ☐
c) A faith-based health facility ☐
d) Receive a vaccine from door to door vaccinators during mass vaccination campaign ☐
e) Any of the above options is ok with me. ☐

Q-18-a) Have you ever been sent back home from the health facility due to lack of vaccine?

☐ Yes ☐ No

Q-18-b) If yes, what did you do to receive the vaccine?

i. I returned later to the same facility
ii. I went to a different facility
iii. I gave up on the vaccine
iv. Other (Briefly explain) ----------

Q-19-a) Do you believe vaccine preventable diseases can be serious? ☐ Yes ☐ No

Q-19-b) Which one(s)? ----------

Q-20-a) Are you concerned about any risk with vaccines? ☐ Yes ☐ No

Q-20-b) What kind of risks? ----------

Q-21) Do you think that the benefits of vaccine, in general, are higher than their risks?

i. Benefits are higher than risks ☐

ii. Risks are higher than benefits ☐

Q-22) Do you consider other activities (e.g. going to market, work, house chores etc.) more important than taking your child for vaccination?

☐ Yes ☐ No

Briefly explain ----------

Q-23-a) Has your healthcare provider ever advised you that a certain vaccine was not necessary or had too many side effects? ☐ Yes ☐ No

Q-23-b) Indicate which one if you can recall ----------

Q-23-c) Did you agree with his/her advice in (a) above? ☐ Yes ☐ No

(Briefly explain) ----------

Q-24-a) Do you think it is possible to have too many vaccines? ☐ Yes ☐ No

Q-24-b) Is it better for a child to have multiple vaccines in one shot with fewer injections or to have individual vaccines?

i. Multiple vaccines in one shot ☐

(Briefly explain) ----------

ii. One vaccine per shot ☐

(Briefly explain) ----------

Q-25) To what extent do you agree or disagree with the following statement for your child.

Adherence to the vaccination schedule recommended by the Ministry of Health is very important.

Strongly Agree ☐

Agree ☐

Neither Agree or Disagree ☐

Disagree ☐

Strongly Disagree ☐

The end.

Thank you for your time & participation