HEALTH FACILITY-BASED INTELLECTUAL CAPITAL AND PROVISION OF PRECONCEPTION CARE IN KISUMU COUNTY-KENYA

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A thesis submitted to the School of Public Health and Biomedical Sciences in partial fulfillment for the requirements of the award of the Doctor of Philosophy in Public Health of Masinde Muliro University of Science and Technology.

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DECLARATION

I hereby declare that this thesis is my original work prepared with no other than the indicated sources and support. To the best of my knowledge, it has not been presented elsewhere for a degree or any other award

Signature. ..... Date.....

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HPH/LH/002/2015

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance of Masinde Muliro University of Science and Technology a thesis titled '**Health Intellectual Capital and Facility-based Provision of Preconception Care in Kisumu County'**.

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I dedicate this thesis to my children: Jewel, Jabali, Joe-roy and Leo.

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ABSTRACT

'Preconception care' (PCC) is the provision of biomedical, behavioral and social health interventions to women and couples before conception occurs. The PCC, is valuable and key in preventing and controlling non-communicable diseases. Health providers' personal and patient factors pertaining to a health care organization and the broader environment affect the delivery of health care services including preconception care. PCC is an intangible product of a health care system and thus is critical to assess its implementation regularly. The key constraint limiting progress is the gap between what is needed and what exists in terms of skills and availability of human resources & infrastructures in the face of increased demand; ineffective referral and weak management systems. This gap is yet to be measured in Kenya more so in Kisumu County. This lack of information threatens success and sustainability of new initiatives like preconception care thus stagnation in reduction of neonatal and maternal indicators. Assessing the strengths and weaknesses of the preconception care system in a place contributes to the preconception care implementation strategy for action in each country as recommended by World Health Organization (WHO). Using a cross-sectional design, this study quantitatively and qualitatively explored preconception care service delivery and how it is influenced by the intellectual capital in health facilities in Kisumu County of Kenya. It specifically sought to determine the level of implementation of PCC and to illustrate how it is influenced by health provider characteristics, facilities and the external environment. Structured interviews were conducted on health providers n=476 and clients n=560 to ascertain their knowledge, perceptions and practice on preconception care respectively. A checklist was used to assess the procedures, processes and resources available for PCC in facilities n=28. Focused group discussions were done to establish the opinions of certain cadres of health providers. The significance in the differences in proportions was determined by the chi square statistic at $P \leq 0.05$. The student t-test and linear regression were used to show the relationship between the factors and preconception care provision rate. The rate of provision was 39% (n=28). There was a significant difference in the mean for cadres, {nurses (M=70.04, SD=8.951) and non-nurses (M=71.90, SD=8.732); t (473) =-2.23, $P = 0.026$)} & years of experience up to 5 years (M=72.04, SD=8.417) and more than 5 years (M=69.89, SD=9.283); t (465) =2.63, $P = 0.009$. PCC inclusion in HMIS reporting was a significant predictor (b= 0.6, t (26) =8.64, $P<0.001$, 95% CI 0.46-0.74) of provision. The mean provision per KEPH levels (M=60.21, SD=4.902); t (26) =-5.06, $P<0.001$ and types of services (M=69.36, SD=4.924); t (26) =4.63, $P<0.001$ were significantly different. Those who resided in rural areas (OR=1.641, $P=0.014$), had a higher level of education (OR=2.42, $P<0.001$), had had previous pregnancies (OR=2.45, $P=0.003$), were married (OR=1.71, $P=0.045$) and have ever heard of preconception care (OR=5.58, $P<0.001$) were likely to express their intention to accept care if offered. Investing in on-job training for health providers especially nurses, establishing a reporting system for PCC activities, creating awareness on PCC and providing care in primary health facilities in rural areas can improve PCC service delivery. The results will inform programs targeting to improve delivery of PCC services so as to improve obstetric outcomes and thus reduce the maternal and neonatal health indicators.

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LIST OF ABBREVIATIONS

ACOG	American College of Obstetricians and Gynecologists
AMCHP	Association of Maternal and Child Health Programs
BMI	Body Mass Index
BOEC	Basic Obstetric Emergency Care
CDC	Centers for Disease control
CHV	Community health volunteer
DM	Diabetes Mellitus
HIV	Human Immuno-deficiency Virus
IC	Intellectual Capital
JOOTRH	Jaramogi Oginga Odinga Teaching and Referral Hospital
KDHS	Kenya Demographic Health Survey
MDGs	Millennium Development Goals
MMUST	Masinde Muliro University of Science and Technology
MNH	Maternal Neonatal Health
MOH	Ministry of Health
NCST	National Council of Science and Technology
PCC	Pre-conception Care
RH	Reproductive Health
SGS	School of Graduate Studies
STIs	Sexually Transmitted Infections
UN	United Nations

OPERATIONAL DEFINITION OF TERMS

Preconception Care- In this study it refers to provision of biomedical, behavioral and social health interventions to women and couples three months before and after conception (periconception period) and between pregnancies (inter-conception period).

Health Facility-based Intellectual Capital- In this study it refers to intangible assets health facilities possess that include the knowledge of individual employees, organizational structures that contain processes, customers or other information that can contribute to improved provision of health care.

Human Capital - Knowledge, skills and experiences owned and used by individuals. For this case; Staffing and skills mix of health providers, knowledge on preconception care for each cadre of service providers, among others.

Structural Capital - Institutionalized knowledge and codified experience stored in databases, procedures, and the organizational culture which includes; Inclusion of preconception care in the Vision, mission, values, strategic plan, availability of fliers and poster among others.

Relational Capital - Knowledge available through networks of relationships internal and external to the health facilities that include, clients' views on preconception care, clients experience or practice on preconception care, perceived cost of receiving this care (time, finance), partnerships with other service providers and referral structures for specialized care.

CHAPTER ONE
INTRODUCTION

1.1 Background to the study

In health systems management quality of service delivery depends on human resource, finance and process elements such as tools that necessary for resources to be effective. These tools include guidelines, protocols and other instruments to ensure rational performance. Further, the knowledge and perceptions of the health providers and patients appertaining to the health care organization, the health care system and broader environment affect delivery of services like preconception care (Mosadeghrad, 2012). These relate to the concept of intellectual capital which essentially refers to intangible assets organizations hold that enable them produce quality tangible and intangible products.

Health care services are intangible products of health care organizations (Leng, Liu, Xiao, Li, & Deng, 2019). Preconception care, as a health service is one such intangible product of health facilities as organizations and is often difficult to measure and there is no evidence of it being done in Kenya. This may be inappropriate since assessing the strengths and weaknesses of the preconception care system in a place contributes to the preconception care implementation strategy for action in each country as recommended by WHO (WHO, 2013).

While many studies have been conducted to assess the quality of health care organizations, few have been done to identify factors that affect quality of the services, preconception care included. Studies have shown that provider knowledge and perception influences PCC provision but have not shown how it is influenced by structural and relational capital (Chang & Hsieh, 2011; Mpaata, Lubogoyi, & Okiria, 2017; Shahzad et al., 2014). Successful

intervention programs require not only knowledge of the effectiveness of the intervention but also the insights into the knowledge, attitudes and health behaviors of the target population (Steel, Lucke, & Adams, 2015). McCorry et al. in 2012, in a qualitative exploration of women's attitudes, demonstrated that the relationship between health care workers and clients' affects use of preconception care (McCorry, Hughes, Spence, Holmes, & Harper, 2012). It is not known if this could be the case in Kisumu County of Kenya.

Human capital in health care has been demonstrated to increase the per capita income of a state in sub-Saharan Africa (Gyimah-Brempong & Wilson, 2004). Moreover, it has also been suggested that in Africa inadequately skilled workforce is a salient constraint in performance of organization (ILO, 2017). A study in sub-Saharan Africa also proposed that intellectual capital in health had a stronger effect in development than in education (Ogundari & Awokuse, 2018). In Kenya, intellectual capital was shown to positively influence performance of pharmaceutical firms (Odhon'g & Omolo, 2015). It has been shown that Kenya utilizes only 30% of its human capital, a facet of intellectual capital, compared to sub-Saharan Africa's 55% and the global proportion of 65% (Schwab, 2016). This with the knowledge that core skills across occupations change overtime points to the need to focus on measuring and developing human capital specific to services including preconception care. This eventually will help increase the optimization of the Kenyan human capital which is at 58% according to the World Economic Forum (Schwab, 2016).

Preconception treatment entails providing women and partners with biomedical, mental, and social health interventions prior to childbirth. It aims to improve their health by reducing

behaviors, as well as individual and environmental factors, that contribute to poor maternal and child health outcomes (WHO, 2013). Preconception cares as an important component of the continuum of maternal health therefore plays a big role in improving maternal and neonatal health indicators (Dean et al., 2013) . Preconception care contributes to a healthy pregnancy and a better obstetric outcome (Dean et al., 2014). Preconception treatment is recognized as a significant contributor to non-communicable disease prevention and control as part of the national policy process (Mason et al., 2014; WHO, 2013).

Preconception treatment has a number of advantages, including the avoidance of premature pregnancies, complications during pregnancy and childbirth, stillbirths, preterm birth and low birth weight, birth defects, neonatal diseases, underweight and birth defects. prevent vertical transmission of HIV/STIs, lower the risk of some forms of childhood cancers, lower the risk of type 2 diabetes and cardiovascular disease later in life (Lan et al., 2017; M'hamdi, Van Voorst, Pinxten, Hilhorst, & Steegers, 2017).

Preconception risk factors are well profiled and intertwined. Addressing these factors comprehensively can go a long way in solving much of the problems (Dubei, 2014). Risk factors associated with poor obstetric outcomes like prematurity include; pregnancy in adolescence, birth spacing (short and long intervals) (Shah & Zao, 2009), pre-pregnancy weight status (underweight) (Zhangbin et al., 2013), overweight and obesity (Pirkola et al., 2010), micronutrient deficiencies (iron and folate) (Dean et al., 2014), chronic diseases (DM, hypertension and anemia), poor mental health (depression and intimate partner violence (Alhusen et al., 2014; Alhusen, Lucea, Bullock, & Sharps, 2013; Dean et al., 2013),

infectious diseases (mumps, rubella, syphilis and HIV/Aids) (Dean, Imam, Lassi, & Bhutta, 2012), and tobacco use (Bottorff et al., 2014; Caleyachetty et al., 2014; Levine, Cheng, Cluss, Marcus, & Kalarchian, 2013).

Risk factors for unhealthy pregnancy that are amenable to preconception care are present in Kenya and more so Kisumu County. The prevalence of teenage pregnancy and motherhood is remains high in Nyanza region as per the two previous Kenya Demographic Health Surveys (KDHS) (Kenya National Bureau of Statistics et al., 2015; KNBS, 2010). According to these surveys, the median age at first birth is lowest in Nyanza at 18.7 years; birth interval of less than 18 months is common in Nyanza Region at 7.6 per 1000 live births, second only to North Eastern. Kisumu County is at the lead at 8.8 for the same within the Nyanza region. Success in achieving reproductive intention is lowest in Nyanza. The gap between wanted and unwanted fertility is widest in Nyanza at 1.5 in as compared to the national gap which shows women having 0.6 child more than the number they intend to get. The proportion of overweight women of reproductive age has increased significantly from 25-33% since 2008 (Kenya National Bureau of Statistics et al., 2015; KNBS, 2010). This emphasizes on the need for comprehensive preconception care provision in order to promote healthy reproduction, improve maternal and neonatal health indicators in this and similar settings.

The rate of preconception care is low worldwide worse in low-income countries since it is not a wide spread concept as of yet (Lassi, Dean, Mallick, & Bhutta, 2014). The rate of use of these services was found to be between 18.7% and 45% among diabetes patients offered

the service in a study done in Canada (Kallas-Koeman, Khandwala, & Donovan, 2012). Another study in England estimated it at 45% (Tripathi, Rankin, Aarvold, Chandler, & Bell, 2010). In United States of America, two studies estimated it at 33% and 47.7% (Bright & Dipietro, 2019; Shadab, Nekuei, & Yadegarfar, 2017). Studies have shown that despite being offered this service very few couples agree to be recruited to the care (Dean, 2014). The studies in Canada, USA and England showed that socio economic status, previous pregnancies and age influenced the uptake of this particular service (Kallas-Koeman et al., 2012; Shadab et al., 2017; Tripathi et al., 2010). This raises the question of what influences its uptake in Kenya. Preconception care still remains a new concept because it is not included in the Kenyan maternal health model as well as the Kenyan health strategic plan. This has minimized the focus on this service thus little is known about the rate of its provision and use and factors that influence it.

Wealthier countries have been able to stage comprehensive preconception programs. In the USA it was realized that public/private partnerships between key state and local level stakeholders combined with strong state leadership and some type of ongoing structure e.g., advisory committee have shown to be core elements of sustained success in provision of comprehensive preconception care. The Oregon, among other, state health team came up with some recommendations in their preconception health action plan. The first was increased public awareness on importance of preconception care by use of information and various tools. Secondly, encourage primary care (community) visits for risk assessment, education and health promotion counselling to all women and to integrate components of preconception health into existing local public health and related programs. Finally, to

maximize public health surveillance and related research mechanisms to monitor preconception health (AMCHP, 2015).

Preconception care interventions in various settings particularly in low-income countries face the challenge of lack of standardization across the line of service delivery, community outreach and organizational policies (Dean et al., 2014). Specifically, key constraint limiting progress is the gap between what is needed and what exists in terms of skills and geographical availability of human resources at local, national and international levels; drugs, supplies and equipment in the face of increased demand; ineffective referral to and inadequate quality services as well as weak management systems (Islam, 2011). Geographical availability of human resources for health has been profiled, gaps identified and strategies put in place as seen in the Kenya Health Sector Human Resource Strategy and the Kenyan Nursing Workforce Report (Ministry of health- Kenya, 2014; Ministry of Health- Kenya, Nursing Council of Kenya, & Emory University Project, 2012). But then, the gap in skills has not been identified and more so in specific services like preconception care.

In Kenya, the National roadmap to accelerating attainment of MDG identified poor access to skilled attendance along the continuum of care, lack of community involvement and delays in seeking care by clients (MOH, 2010b). This basically implies gaps in linking the health care services targeting MNH, including preconception care, to the prospective clients. Ultimately these gaps in relational capital, a component of intellectual capital, may have contributed to non-improvement of maternal and newborn health in Kenya. Thus, the need

to measure these gaps in preconception cares provision with the aim of reducing them so as to increase uptake in Kenya and specifically in Kisumu County.

Sustainable development goal three highlights the fact that only half the women in developing countries have received the health care they need. Therefore, one of its targets is to reduce maternal mortality to less than 70 per 100,000 live births (UN, 2015). This shows the magnitude of ground to be covered to reduce the figure from 362 per 100000 live births in Kenya (Kenya National Bureau of Statistics et al., 2015). Efforts to improve maternal and neonatal health (MNH) in Kenya have concentrated on programs targeting the prenatal, perinatal and postnatal periods while little attention has been given to the preconception period, which is an essential element of the continuum of care. These programs as informed by the Kenya maternal and newborn health model are;- focused antenatal care, essential obstetric care, essential newborn care, targeted post-partum care, post abortion care and family planning (MOH, 2009). The Kenya maternal and neonatal health model, which was derived from the global strategy of safe mother hood, excludes the preconception care. Little is known as to why components of preconception care have not been included except for family planning.

Current evidence suggests that the causes of unhealthy birth growth and development– whether based on malnutrition, infectious disease, social or other factors – are interwoven, and that addressing them one at a time can solve only a small fraction of the problem (Dubei, 2014). This emphasizes the need for a more comprehensive preconception program,

which includes locally applicable recommended interventions as identified by the WHO (Dean et al., 2014).

The value of reproductive freedom was stressed at the third decennial International Conference on Population and Development (ICPD) in Cairo in 1994. It came up with a concept of reproductive health that included "access to adequate health care services that enable women to safely navigate pregnancy and childbirth and give couples the best chance of having a healthy baby." (Boulet, Parker, & Atrash, 2006). The 4th ICPD conference identified zero maternal deaths, zero unmet need for family planning and zero gender-based violence and other harmful practices like female genital mutilation which are all preconception interventions as their priority agenda for the next decade (United Nations Population Fund, 2019). Preconceptions interventions have been identified (Dean et al., 2014) and models for implementation have been suggested (Mason et al., 2014). Preconception care initiatives are increasingly being implemented in both high-income countries like Italy, the Netherlands, and the United States, as well as low- and middle-income countries like Bangladesh, the Philippines, and Sri Lanka. In developed countries, data on maternal and child outcomes following the implementation of preconception care practices is often unavailable (St Fleur, Damus, & Jack, 2016). Further, tailored made packages for provision of preconception care are not available in Kenya more so in Kisumu County. Thus, the need to study the structural capital available to enable implementation of a sustainable preconception care program in this setting. Establishment of preconception care services need not wait for prenatal care system to be adequate or perfect but can in fact complement the efforts to improve prenatal care uptake (Mason et al., 2014).

1.2 Problem Statement

The UN Assembly of 2015 declared the 3rd Sustainable Development Goal so as to ensure healthy lives and promote wellbeing for al all ages (UN, 2015). The maternal and neonatal mortality rates are still high globally. In Kenya, the maternal mortality rate is 362 per 100,000 live births and worse in Kisumu County at 495 per 100,000 (Kenya National Bureau of Statistics et al., 2015). The challenges in achieving the desired maternal and neonatal health in Kenya is the gap between what is needed and what exist in terms of skills, supplies among other resources in the face of increased demand (MOH, 2010b). More so, health provider competence, inadequate articulation of MNH issues in preservice curricular and of awareness of the service on the part of the reproductive customers. This gap is yet to be ascertained in the case of preconception care. Consequentially, this could have led to an imbalance in the continuum of care with priority being given to interventions targeting prenatal, perinatal and postpartum periods at the expense of preconception care as evidenced in the National roadmap to attainment of MNH strategic objective 5 (MOH, 2010b).

PCC interventions have been identified and packages have been suggested. Wealthier countries have been able to stage comprehensive preconception programs. But there are no tailor-made packages for Kisumu County and in Kenya generally. In Kenya preconception care is offered to a fleeting minority, vulnerable groups like those living with HIV aids and only family planning of the services offered under safe motherhood program is relevant to preconception care (Boulet et al., 2006). Preconception cares is key in improving maternal and neonatal health indicators (Dean et al., 2014). It also creates demand for other services like antenatal care. The PCC implementation is yet to be measured in the current setting.

Health care service provision depends on factors such as providers experiences, individualized ability and personalities (Mosadeghrad, 2012). Thus, the various cadres of health care professionals necessary for its implementation diversify preconception care. These include nurses, clinical officers, nutritionist and community health extension workers as well as community health assistants. The training of these professionals differs greatly in terms of curriculum and length of training. The training levels also differ, that is, we have those trained at certificate, diploma, undergraduate and postgraduate level. This raised a question of whether these disparities affect preconception care provision. It further questioned the adequacy of training for the role of implementing this care and whether some cadres have a competitive advantage with regard to intellectual capital required in PCC provision.

Health facilities internal processes, vision, mission, service charter and HMIS which form structural capital play a critical role in determining PCC implementation. This coupled with the extent to which the health facility is linked to the community and other partners (relational capital) go a long way in determining provision and effectiveness of PCC services. This study, therefore, was proposed to estimate the rate of preconception care provision and to determine how it is influenced by the health workers as human capital, the internal (structural capital) and external environment (relational capital) in health facilities in Kisumu County of Kenya.

1.3 Significance of the study

Whereas innovations for improving obstetric outcomes is a priority, disparities in health resource allocation and care coordination have constrained design and implementation of effective RH interventions (MOH, 2010a, 2010b). This study gives insight on management of available resources to maximize their potential. More so the human resources since the WHO framework describes health workforce as one of six core components of a well-functioning health system (WHO, 2014). Data pertaining preconception care activities is often unavailable because it is left out of the reporting systems of the Ministry of Health. This provides the opportunities to build on to ensure availability of data for preconception care. Preconception care services need not wait for perinatal and post-natal care system evaluation to adequately determine its scale and impact. This can in fact be ascertained by assessing the level of implementation of this service. This knowledge thereof can complement the efforts to improve preconception and prenatal care uptake.

Preconception health care is a strategic objective of Healthy People 2020 (ODPHP, 2016) Further the UN Millennium project report stated that strengthening the health system is the central process recommended for ensuring universal access to necessary services for women and children and increasing their use of such services (UN, 2005). It further intimated that strengthening human resources is critical to ensuring inclusive and equitable health systems. The WHO identified improvement of health systems (infrastructure, management, distribution of goods, training of providers) to deliver preconception care as a priority research area (Dean et al., 2013). This study, therefore contribute to achievement of these objectives and fulfillment of reproductive needs of women.

The study was necessary to ascertain the intellectual capital for implementation of preconception care in the study setting through the exploration of knowledge, perceptions and use of preconception care information by reproductive health care providers and reproductive health care users. The study also explored the opportunities and system structures available that may enable implementation of search activities. The findings of this study may guide stakeholders in program planning for integration of preconception care with other service in the continuum of maternal and newborn health.

1.4 Objectives of the study

1.4.1 Broad Objective

To ascertain the intellectual capital of health facilities and provision of preconception care in Kisumu County of Kenya

1.4.2 Specific Objectives

1. To establish the rate of preconception care provision in Kisumu County health facilities.
2. To determine the influence of the human capital on provision of pre-conception care in health facilities in Kisumu County.
3. To examine influence of structural capital on provision of preconception care in health facilities in Kisumu County.
4. To determine the influence of relational capital on provision of preconception care health facilities in Kisumu County.

1.4.3 Research Questions

1. What is the rate of preconception care provision in Kisumu County health facilities?
2. To what extent is human capital of Kisumu County Health facilities developed and how does it influence pre-conception care provision?
3. What is the available structural capital for provision of preconception care in Kisumu County health facilities and how does it affect preconception care service delivery?
4. What is the available relational capital of preconception care in Kisumu County health facilities and how does it influence provision of preconception care?

1.5 Scope and delimitations of the study

The study focused on level 2, 3, 4, and 5 public health facilities within Kisumu county of Kenya. It specifically looked at how well the facilities were prepared to provide preconception care in terms of the human resource (human capital), structures (structural capital) and readiness of the possible clients to receive this care (relational capital). The health workers interviewed were those found on duty in reproductive health departments (maternity MCH/FP, outpatient) during the specified period.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section contains reviewed literature to shed light on the concept of preconception care, rate of provision and its use. Further it delves into various findings regarding the use of intellectual capital theory to study factors that influence provision of health services including preconception care.

2.1 Concept of preconception care

Preconception care covers the period before a first pregnancy occurs, and between two pregnancies. Its ultimate aim is improved maternal and child health outcomes (Lassi et al., 2014). There are a number of preconception care interventions but their suitability depends on the sociocultural factors as well the epidemiology of a particular region. A total of 72 interventions have been identified as solutions addressing particular risk factors during preconception period that can influence pregnancy outcomes by a WHO consortium preconception care (Appendix 1) (Dean et al., 2013).

For instance, nutritional deficiencies like iron and folate can lead to premature delivery (Dean et al., 2014). Same as pre-pregnancy underweight (Shah & Zao, 2009), overweight (Pirkola et al., 2010) and diabetes mellitus (Dean et al., 2013). To address these, among other nutritional deficiencies and disorders, several interventions have been proposed; screening for anemia and diabetes, supplementing iron and folic acid, information, education and counselling, monitoring nutritional status, supplementing energy- and nutrient-dense

food, management of diabetes, including counselling people with diabetes mellitus, promoting exercise and iodization of salt. Similarly, diseases like rubella, syphilis that can cause malformations of the fetus, mumps that can cause miscarriages, hepatitis B, diphtheria and tetanus to prevent neonatal tetanus can be vaccinated against.

The other risks with suggested interventions in framework include tobacco use, environmental exposures, genetic disorders, early, unwanted and rapid successive pregnancies, sexually transmitted infections, HIV, infertility and subfertility, female genital mutilation, mental health disorders, psychoactive substance use and interpersonal violence (Dean et al., 2013). These risks were used to measure provision of preconception care rate in this study.

Further, interventions are frequently bundled together to promote delivery of organized and effective PCC by easing logistics thus ensuring efficiency. For instance Mason et al proposed, grouping these interventions according to levels of care i.e. community, primary and referral (Mason et al., 2014). Whereas this model may be effective it cannot be assumed that it can apply in the current setting considering the diversity of challenges facing the Kenyan health sector. Thus, this study included provision of the whole list of suggested interventions to check whether the levels of service delivery within the Kisumu County can influence provision of this care. This way, the rates of provision of these interventions can form a basis for creating models of providing this care in similar settings.

Preconception care has a number of advantages, including the reduction of maternal and child mortality, the prevention of unintended pregnancies, the prevention of complications

during pregnancy and delivery, the prevention of stillbirths, preterm births, and low birth weight, the prevention of birth defects, the prevention of neonatal infections, the prevention of underweight and stunting, and the prevention of vertical transmission of HIV/STIs (Dean et al., 2013).

Preconception care is a vital initiative for better maternal, neonatal and child health outcomes. It requires an innovative multipronged approach consisting of diverse strategies that interlink health and other social disciplines. There is need for adequate management support, structural adequacy, proper linkages and the human resource for these innovative approaches to succeed. However, an increasing divide exist on how to measure innovation's effectiveness and management support in healthcare systems. This is so because healthcare is often not put into practice efficiently and effectively consequently not evaluated. More so in developing countries, Kenya included. Yet, there are many confounders and enablers of outcomes in health than can be measured (Evans, Brown, & Baker, 2015). This lack of reliable evidence for determining causality between an intervention and outcomes or impact severely threatens the prioritization, success and sustainability of vital initiatives like preconception care (Gage, Ali, & Suzuki, 2005). However, assessing the intellectual capital for specific services of the health system can give overall direction on how well they are implemented and recommend room for improvement.

The main reasons for non-improvement of MNH in Kenya as identified by the national roadmap to accelerating attainment of the MDGs related to MNH in Kenya in 2010 were; poor access to skilled attendance along the continuum of care, lack of community

involvement, high unmet need for family planning and delays in seeking care (MOH, 2010). The gap between what is needed and what is available in terms of skills and geographical availability of human resources at the local, national, and international levels, infrastructures; drugs, supplies, and equipment in the face of increased demand; lack of transportation; ineffective referral to and inadequate availability of 24-hour quality services in particular are key constraints limiting progress (Islam, 2011). These challenges include several of the levels of health system framework measuring this gap therefore will inform optimization of provision of preconception care to achieve aforementioned benefits.

Assessing the strengths and weaknesses of the preconception care system in a place contributes to the preconception care implementation strategy for action in each country as recommended by WHO (Figure 2.1).

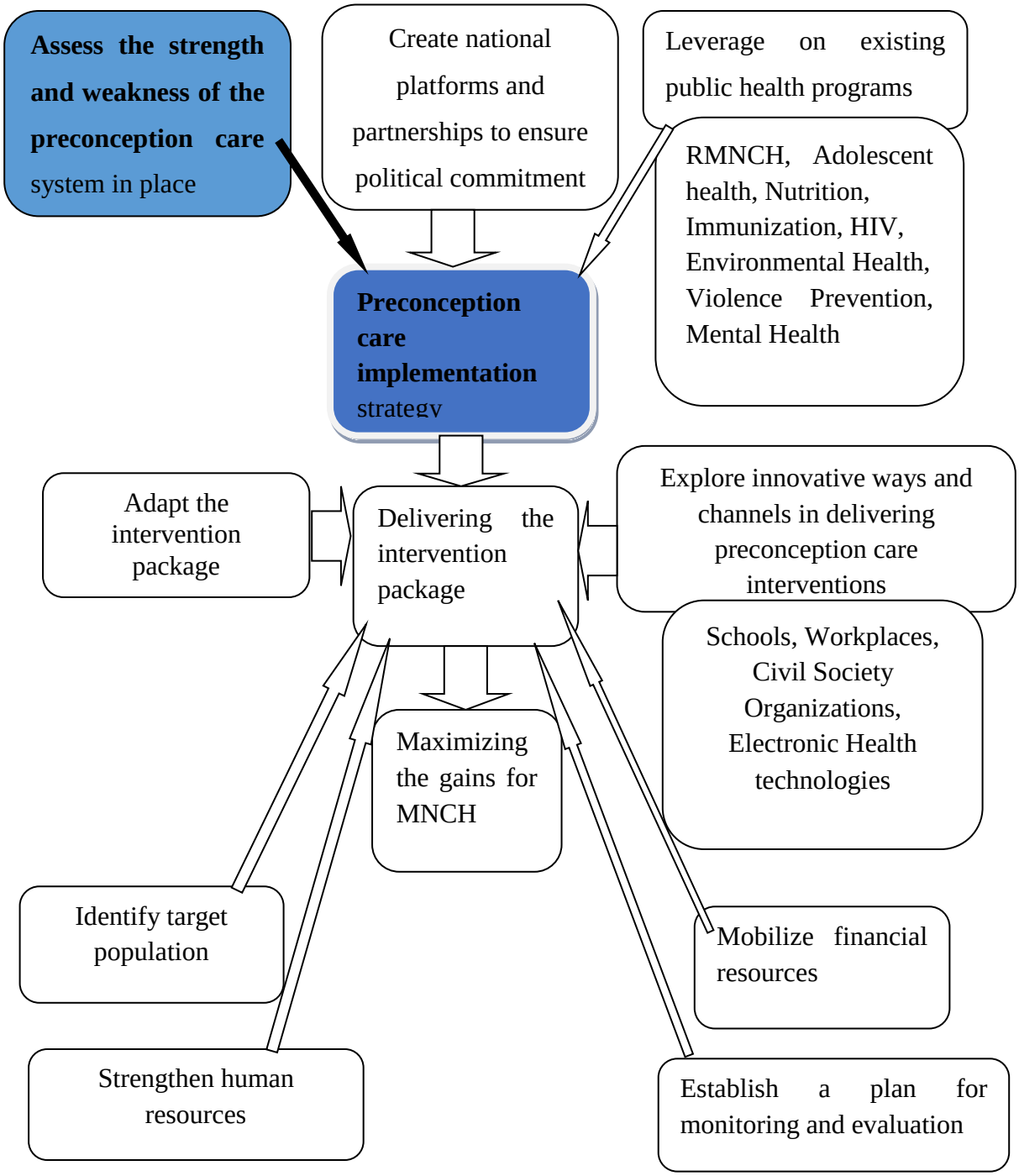

Figure 2.1. Implementation strategy for country action (Mason et al., 2014)

The highlighted box indicates the focus of this study as an action towards preconception care implementation strategizing in Kenya as recommended by the World Health Organization.

2.2 The Concept of Health Intellectual Capital

Al-Abrrow (2014) defined intellectual capital (IC) as valuable assets that are a source of competitive advantage and value creation (Al-Abrrow, 2014). The study described it as consisting of human, structural, and customer/relational capital. In another study, IC was broadly defined as the "intangible resources embedded in organizations" and made of human, structural, social and stakeholder capital (Carlucci & Schiuma, 2012). Corso et al (2007) stated that IC was coined as a replacement for the accounting term "intangible assets" (Corso, Mercy, Simon, Finkelstein, & Miller, 2007). Howard Stewart, a renowned enthusiast of Intellectual capital theory referred to it as the intellectual material that has been formalized, captured, and leveraged to produce a higher-valued asset (Ahmad & Abazeed, 2017; Chang & Hsieh, 2011). Edvinsson & Malone defined it as the possession of knowledge, applied experience, organizational technology, customer relationships and professional skills that provide a competitive edge in the market" (Evans et al., 2015).

From these definitions, it can be concluded that IC refers to intangible organizational assets including, the knowledge of individual employees, organizational structures that contain processes, customers or other information that can contribute to improved organizational performance. Relating to the health sector, health facilities are examples of the organizations aforementioned and the extent to which they achieve their mandate depends on their intellectual capital. Intellectual capital has a significant positive relationship with hospital performance (Singh, Sidhu, Mahesh, & Kansal, 2016). Hospitals are knowledge intensive and require financial resources in order to provide quality health services. Because of budget constraints and severe policies they are forced to use non-financial resources in order to

compensate for the reduction of public funding resulting in short cuts which sometimes compromises quality (OECD, WHO & World Bank Group , 2018). Utilization of intellectual capital can be key in mitigating this.

Interest in intellectual capital theory has increased in recent years and has been applied in fields like education to show the need to invest in the human resources available to increase the quality of education provided. In nursing the theory has been modified to the Nursing Intellectual Capital Theory. The nursing intellectual capital theory has been used in research to test its ability to be used to evaluate the various levels of nursing professionals, the knowledge they hold, and its effect on patient care (Covell & Sidani, 2013). In that study, there were difficulties in operationalizing the relational capital. This implied need for more research especially in the health sector to shed some light on its applicability in other fields other than management.

Qualitative studies have involved semi-structured interviews with managers in hospitals and a few have included clinical staff as part of the respondent sample in assessing the intellectual capital of health services delivery systems (Evans et al., 2015). In Taiwan, a study done to explore the perceptions of nurse supervisors in public hospital on factors influencing performance, demonstrated that structural capital was rated highest followed by relational capital and lastly human capital (Chang & Hsieh, 2011). This shows that health workers perceive components of intellectual capital as some of the important determinants of their performance.

Studies specific on preconception care have mainly looked at the perspectives of health providers and women in general on the feasibility of implementing the services with regard to barriers and enablers (Kallas-Koeman et al., 2012; Lassi et al., 2014; M'Hamdi, van Voorst, Pinxten, Hilhorst, & Steegers, 2017; Mazza, Chapman, & Michie, 2013; Shadab et al., 2017; Tripathi et al., 2010). None has studied intellectual capital available in health care facilities to provide this preconception care services and more so in facilities in Kisumu County.

The concept and framework of intellectual capital offers a means to study the value of intangible resources in health care organization, how to manage these resources and their mutually enhancing interaction on performance (Evans et al., 2015). Studies have further ascribed that human capital is the most valuable asset in a health care organization and it includes knowledge, experience and skills of the employees (Shahzad et al., 2014). Furthermore, Structural capital supports human capital and it includes procedures rules regulations and patented rights. The relationships of a health organization with stakeholders within and without are of importance here unto refer to relational capital.

Thus, this literature review looked at various findings regarding the use of intellectual capital theory to study factors that influence provision of health services including preconception care.

2.3 Preconception Care Provision

Sustainable development goal three highlights the fact that only half the women in developing countries have received the health care they need. Therefore, one of its targets is

to reduce maternal mortality to less 70 per 100,000 live births (UN, 2015). This may be a big challenge since maternal mortality rate is still high in Kenya at 362 per 100,000 live births and much higher in Kisumu at 495 per 100,000 live births (KNBS, 2015). The non-improvement of maternal indicators is even more significant for neonatal survival. According to the KDHS 2008/2009 neonatal mortality rate reduced marginally from 33 to 31 per 1000 live births and again increased to 33% in the 2014 KDHS (Kenya National Bureau of Statistics et al., 2015; KNBS, 2010). Thus, the need to shift attention to other opportunities that may influence improvement of these indicators.

There is growing experience in implementing preconception care initiatives both in high-income countries, such as Italy, the Netherlands and the United States, and in low- and middle-income countries, such as Bangladesh, the Philippines and Sri Lanka (Mason et al., 2014). Globally the prevalence of preconception care engagement remains sub optimal (Steel et al., 2015). Studies reviewed estimated preconception care provision and uptake rates between 15% and 45% (Ayalew, Mulat, Dile, & Simegn, 2017; Bright & Dipietro, 2019; Kallas-Koeman et al., 2012; Kassa, Human, & Gemeda, 2018; Mittal, Dandekar, & Hessler, 2014; Shadab et al., 2017; Tripathi et al., 2010; Zhu, Graham, Teh, & Hornbuckle, 2012). For instance, a study done to explore preconception care use among diabetic women estimated it in type 1 diabetes, at 43.1% and at 18.4% for type 2 diabetes (Kachoria & Oza-Frank, 2014). In Ethiopia the level of implementation was estimated as low as 15% (Kassa, Human, & Gemeda, 2019) while in Egypt utilization was reported to be as low as 2.7% (Idris, Sambo, & Ibrahim, 2013). Two unpublished thesis studies have been done in Kenya.

One measuring the level of knowledge of mothers on preconception care in Kiambu County (Chepngetich, 2018).

The second was looking at preconception preparedness among antenatal and postnatal clients at Coast General Hospital (Ombacho & Ongeso, 2018). Unfortunately, none has been done to measure the rate and level of implementation of this service in Kenya and more especially in Kisumu County.

Most programs targeting MNH in Kenya have hence concentrated on activities carried out during the prenatal, perinatal and postnatal periods at the expense of the preconception period, which is an essential element of the continuum of care. These activities as informed by the Kenya maternal and newborn health model are; - focused antenatal care, essential obstetric care, essential newborn care, targeted post-partum care, post abortion care and family planning. The Kenya maternal child health and newborn health model, which was derived from the global strategy of safe mother hood, excludes the preconception care. Establishment of preconception care services need not wait for prenatal care system to be adequate or perfect but can in fact complement the efforts to improve prenatal care uptake (Ebrahim et al., 2006).

The specific goals of a project established in Latin America to provide a comprehensive preconception care package included (1) risk assessment (identify person, family, and social risks and barriers to prenatal care); (2) health promotion (ensure proper nutrition; avoid substance, tobacco, and alcohol use; provide family planning; perform PAP smear screening, and provide ongoing care); and (3) reproductive health (ensure proper nutrition;

avoid substance, tobacco, and alcohol use; provide family planning; perform PAP smear screening, and provide ongoing (treat medical conditions and infections such as malaria and sexually transmitted diseases, update immunizations, provide nutritional supplementation such as folic acid, and conduct home visits)(Boulet et al., 2006). Another study identified priority interventions and packages during pre-pregnancy to reduce poor obstetric outcomes included supplementation of essential micro-nutrients, promote vaccination of children and adolescents, screening, diagnosis and management of mental health problems, prevent and treat STIs including HIV/Aids, screen for, diagnose and manage chronic diseases including DM and hypertension (Dean et al., 2012, 2014). Yet preconception interventions that are implemented in various settings particularly in low-income countries face the challenge of a lack of standardization across the line of service delivery, community outreach, and organizational policies (Lassi et al., 2014). This points to the need for tailored made preconception program, which includes most the recommended interventions and not merely family planning like for the case of Kenya. This study sought to identify the services that can be sustainably provided as a package for specific levels of care.

2.4 Human Capital and preconception care

Human capital refers to the knowledge, skills and experiences owned and used by individuals in meeting organizational goals (Bontis, 1999). Studies have concluded that recruiting and retaining the best employees is only part of the equation, an organization must also leverage the skills and capabilities of its employees by encouraging individual and organizational learning and creating a supportive environment, in which knowledge can be created, shared and applied (Subramaniam & Youndt, 2005). This is true not only in the

management fields but also in all sectors including that of health, where the doctors, nurses, clinical officers and nutritionists among others are expected to possess the requisite knowledge, skills and attitudes that will give a particular health facility a competitive edge over others.

A study on the role of Organizational Learning and Intellectual Capital in the Public Healthcare Sector revealed that transformational leadership (patient focus and an employee focus) has a significant positive effect on organizational performance (Al-Abrrow, 2014). Another one proposed that nurse staffing and employer support for continuing professional development are associated with good patient and organizational outcome (Covell & Sidani, 2013). Another study also revealed that training and employee competencies influenced patient outcomes (Carlucci & Schiuma, 2012). Similarly, it was demonstrated that individual nurse characteristics (education, experience, career planning & development, autonomy, job satisfaction, organizational trust, education, experience, and attitudes) influenced outcomes like reduction of nursing errors related to patient safety and patient satisfaction with nursing care (Hall, 2003). In Uganda, it was demonstrated that presence of highly specialized staff in hospitals significantly increased the quality of care (Mpaata et al., 2017).

A study done looking at the barriers and enablers of preconception care service provision by general practitioners revealed that General Practitioners (GPs) felt that they did not have the opportunity to deliver the Pre-conception Care (PCC) as per guidelines as women often did not present at the preconception stage (Mazza et al., 2013). They also felt spina bifida and Neural Tube Defects were too rare to warrant specific action. The study further revealed that

GPs did not raise PCC with women of reproductive age because of other competing preventive care priorities and the potential increase in burden on clinics if the number of PCC consultations was increased. Another study in Ethiopia demonstrated that health providers who had low knowledge on PCC had four times higher odds of not providing care (Kassa, Human, & Gemeda, 2018). A study done in Nigeria concluded that negative provider attitude was a barrier to utilization of preconception care (Idris et al., 2013). This demonstrates how employee knowledge, priorities and attitudes can influence provision of services including preconception care.

Perspectives of other health care providers, who play a big role in implementation of other reproductive health services in our settings, regarding preconception care are yet to be documented. Besides, one study suggested need to explore involvement of nurse practitioners to improve delivery of PCC (Mazza, Chapman, & Michie, 2013). Thus, this study included nurses, doctors, nutritionists, laboratory technicians and community health workers as respondents.

2.5 Structural Capital and preconception care

Structural capital is defined as codified knowledge present in procedures, databases, manuals and guidelines (Mura, Lettieri, Spiller, & Radaelli, 2012). Any organization is expected to have structures that will guide communication and reporting relationships, procedures and routines for undertaking tasks. Such structures, guidelines and procedures may be stored in manuals or databases for dissemination to new employees and for future references by all members of the organization. The codified knowledge in this procedures,

manuals and guideline ensures that organizations operations including those of a health facility are carried out in a manner that upholds certain expected standards. A study evaluating a public hospital through the lens of intellectual capital, was able to describe the weaknesses and strengths of the hospital as an organization (Carlucci & Schiuma, 2012). That study conceptualized structural capital to include knowledge of hospital's mission, vision, strategic plan; teamwork; physical workspace; organizational rewards; management support; info sharing and dissemination at organizational level; and conflict management. Equally, components of structural capital specific to health organizations can include patient relationships, procedures, systems manuals, employment agreements, and service agreement (Gogana, Durana, & Draghicia, 2014).

Dean et al., (2014) recognizes that women who received preconception treatment in a healthcare facility or in the community had better results, such as quitting smoking, more folic acid use, breastfeeding, having a higher chance of getting antenatal care, and having lower neonatal mortality rates. Availability of supplies and equipment that can be utilized to provide care increase chances of PCC being implemented. In the Netherlands, barriers to the use of preconception care services included unnecessary medical examinations, an inability to effect change among unintended pregnancies, and additional costs (Bekkers et al., 1999). Enablers of preconception care delivery included availability of brochures, checklists, handouts and waiting room posters (Mazza et al., 2013). In Ethiopia, a study reported that health providers in bigger facilities, who had access to smart phones and PCC guidelines had higher knowledge of PCC and consequentially were likely to provide care (Kassa, Human, & Gemeda, 2019). This implied that the level of health facilities influenced provision of

care. From these studies, some specific structural capital necessary to increase uptake and provision of preconception care was identified.

Policies on implementation of preconception care are available and various checklists have been published (ACOG, 2013; Dean et al., 2014). The Kenya National Reproductive health strategy 2009-2015 highlighted the private sector as to supplement government efforts in the formulation and implementation of RH projects but failed to mention preconception care as part of the reproductive health services offered in the country (MOH, 2009). Of interest to this study therefore is whether the services are being offered, are there guidelines or job aids available to help in implementation or any other such resources. Further, whether PCC is included in the service delivery charter for clients and documented in the health information management systems in facilities in Kenya or not.

2.6 Relational Capital and preconception care

Health public policy advocates a shift in focus from short-term results to broader notions of clients' satisfaction (Borgermans et al., 2017). In this era of technology, patients are no longer passive care receivers but consumers who take an active role in their care (Borgermans & Devroey, 2017). Just like in any other entity in the service sector it is critical to build relationships between a provider and a consumer of a service, hence the pivotal role of relational capital. Relational capital is defined as knowledge resources embedded within, available through, and derived from networks of relationships and ties between customers and organizations, buyers and suppliers (Subramaniam & Youndt, 2005). In health, relational capital can be viewed as relationships with patients, different professional groups,

other hospitals and other stakeholders (Evans et al., 2015). Therefore, reproductive health clients who are preconception care customers, their knowledge and attitudes are paramount in PCC service delivery. Furthermore, linkages, referral systems and partnerships increase accessibility of PCC services.

A previous research looked at women's attitudes toward preconception treatment. The majority of women were unaware of the importance of seeking preconception treatment and were shocked by the variety of issues that were involved. Women also thought general practitioners (GPs) should be more effective in encouraging preconception care availability, but they agreed that they had to be considering pregnancy or already pregnant to be open to it. Confusion about the reasons for using folate, the dosage, length, pacing, and efficacy of folate supplementation were all barriers to preconception folate supplementation. (Mazza et al., 2013). This finding is a pointer to weakness on the part of the provider in information for making choices and building trust with patients or clients. Further in the aforementioned study, The willingness to do whatever they could to ensure the best possible pregnancy results, as well as promotional materials and letters of invitation from their GP informing them of the availability and need for preconception treatment, were both enablers. These demonstrate the importance of clients' knowledge and attitude in implementation of PCC. Perspectives of women on this service in the proposed study setting are not yet documented.

It has been theorized that reaching prospective parents before the onset of pregnancy is crucial for effective preconception care. But research has shown that women do not actively seek preconception care consultation, nor do they enthusiastically accept the offer to attend a

consultation (Erasmus, 2015). Elsewhere it has been shown that lack of awareness is an impediment in provision of preconception care (Abedini, Nekuei, Kianpour, & Jabbari, 2018; M'hamdi et al., 2017). In this case the level of awareness on preconception care may influence the demand for preconception care. This is in the view that the level of awareness on a need and satisfaction with services received are directly proportional to the need for fulfilment (Mkpojiogu & Hashim, 2016; Seth, 2018; Srivastava, Malik, & Kumar, 2016). It is appreciated that demand drive supply of goods and services like preconception care.

The level of awareness on PCC among clients is relatively low globally. In Mexico it was estimated at 76% (n=305) (Coonrod, Bruce, Malcolm, Drachman, & Frey, 2009) while in Nigeria it was found to be as low as 4% (n=150) (Idris et al., 2013). In Egypt it was found to be 27.5% (n=422) (Ayalew, Mulat, Dile, & Simegn, 2017) while in Ethiopia level of awareness on preconception folic acid supplementation was 15.9% (Ayalew et al., 2017). Little is known about level of awareness and the lack of readiness to seek these services in Kenya and Kisumu County. Thus, there was need to determine the level of awareness and readiness of women to receive preconception care in Kisumu County.

Pilot studies done in China indicate that although women are interested in information about preconception health, numerous barriers to implementing a national program exist, including vertical health systems, a lack of coordinated efforts among governmental organizations providing family planning and primary health care, and an abundance of potentially confusing (Ebrahim et al., 2006; Zhangbin et al., 2013; Zhao et al., 2014). These exemplify the importance of relational capital in implementation of preconception care. There is

limited documentation on availability of linkages and referral systems in this current setting and others which are similar.

2.7 Theories and models

The intellectual capital theory, the systems thinking theory and the preconception care intervention framework were employed to explain the interaction of variables in determining capacity of the system to provide preconception care.

2.7.1 Preconception care intervention framework

The broad concept of preconception care includes interventions targeting the three etiological levels of poor maternal and neonatal outcomes. These levels are; - the underlying, intermediate causes and immediate causes as shown in Figure 2.2 (Dean et al., 2014). The physical environment, social, economic, political context make up the underlying causes, the formal and formal community structures are the intermediate causes and finally the biomedical and life style risks are the immediate causes of morbidity, mortality and morbidity. Whereas the health system plays role in each of the levels of intervention, health facilities are directly involved in provision of interventions targeting the immediate causes. These interventions formed the preconception package and were used in this study as the dependent variables.

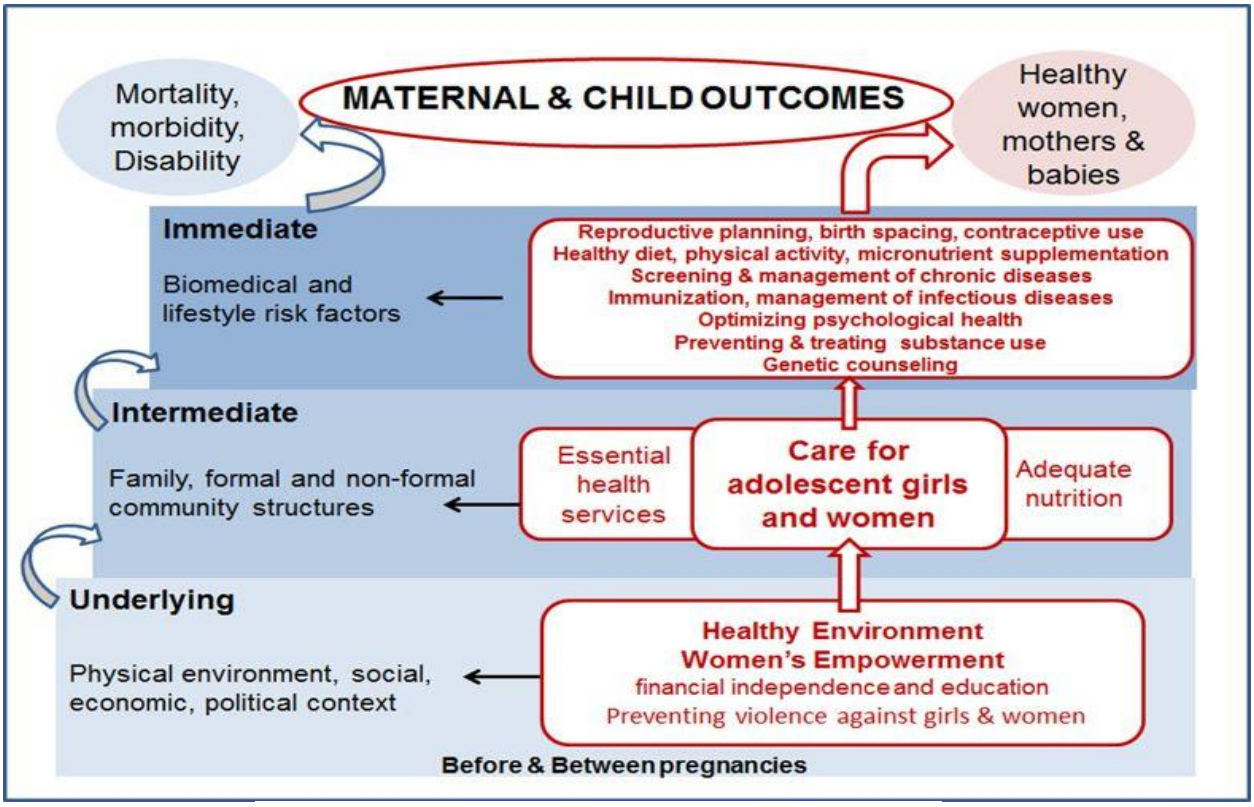

Figure 2.2. Preconception intervention framework

The underlying and intermediate factors in this framework were seen to confound the relationship between intellectual capital and provision of PCC

2.7.2 The systems theory

The systems thinking is a far-reaching solution to many challenges in health service delivery currently. The health system can be divided into four levels to include the patient, the care team, the organization and the external environment (National Academy of Engineering (US) and Institute of Medicine (US) Committee on Engineering and the Health Care System, 2005). To improve health care operations, it is important to understand the systems that influence the delivery of care. Clinical care delivery is embedded in a series of interconnected systems (see figure 2.3). Whereas it could have been used describe this

study, it was difficult to operationalize it, since its constructs are broad.

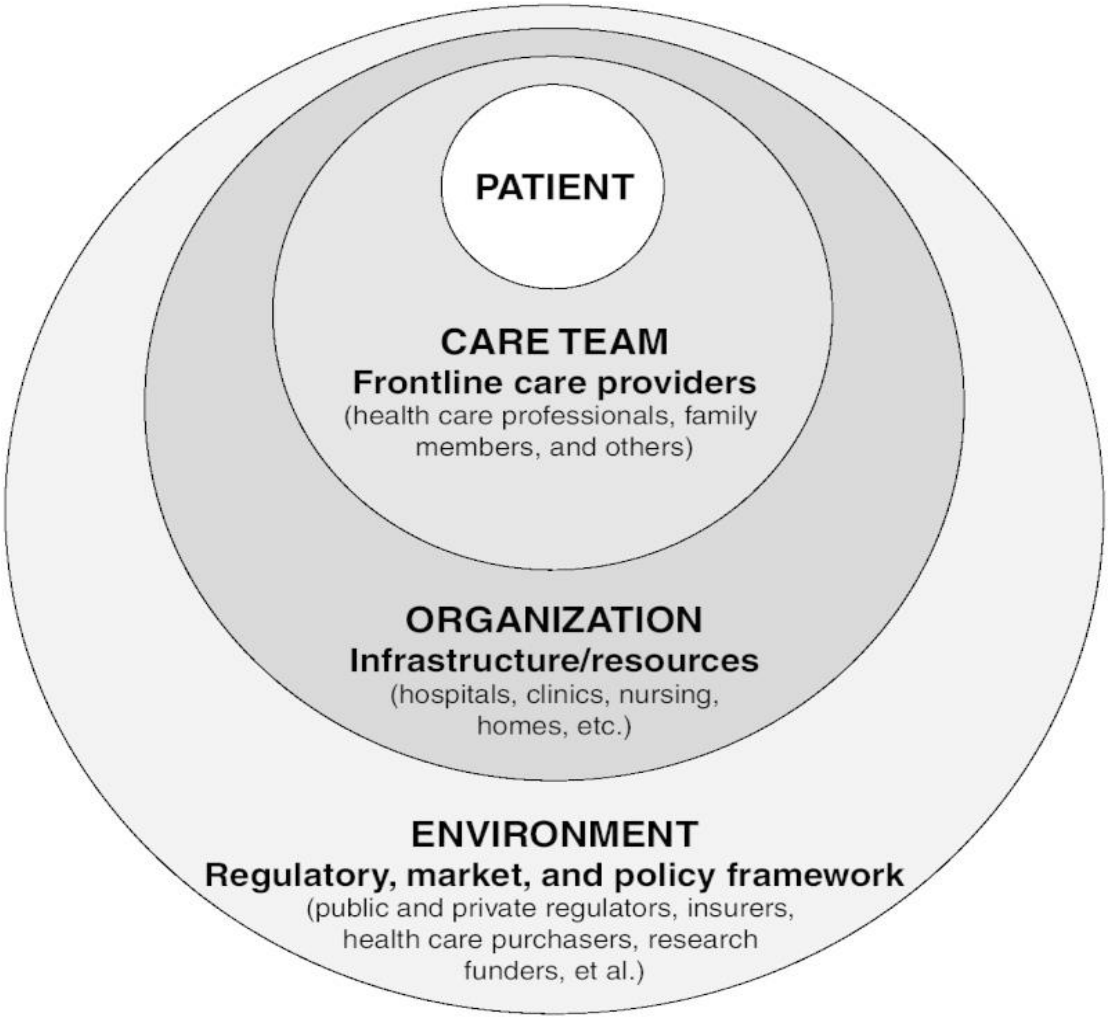

Figure 2.3. Systems thinking in health care delivery

Source; ("WHO | Systems Thinking for Health Systems Strengthening," 2017)

The intellectual capital components; human capital falls under the frontline care providers in this model, the structural capital forms part of the infrastructures/resources whereas relational capital relates to the environmental attributes in the model. Some factors in level of environment are the modifying factors in the relationship between intellectual capital and preconception care.

2.7.3 The intellectual capital theory

Intellectual capital is a management model that was started when there was realization that physical assets are not the only things that contribute to the profitability and performance of an organization (Hudgins, 2014). That the value of an organization includes both the tangible and intangible assets. Thomas Stewart as cited by Jelonek, defines Intellectual capital (IC) as the aggregate knowledge, experience, information and intellectual property that an organization possess that will enhance the organizations competitiveness (Jelonek, 2016). This theory describes intellectual capital being made up of human capital, structural capital and relational capital (Örnek & Ayas, 2015). Thus, intellectual capital is intangible and is found in the employees of the organization. That to evaluate an organization one has to consider both the infrastructure, financial capital and the human capital owned by the company. An organization may have the finance but without a competent and knowledgeable human resource pool, it may not be able to achieve its goals. In the health sector, health facilities may be well funded by both local and international partners, have state of the art equipment but the extent to which they will deliver on their mandate is dependent on the quality of its staff. The quality of such staff is domiciled in their capabilities, knowledge, skills and possibly temperament. As a result, focus on health workers, their work environment, work processes, client relations as well as the organizations partnerships is critical in delivery of services.

With that realization, interest in intellectual capital theory has increased in recent years and has been applied in other fields. In education, it has been used to show the need to invest in the human resources available to increase the quality of education provided (Secundo,

Lombardi, & Dumay, 2018). In nursing, the theory has been modified to the Nursing Intellectual Capital Theory. The nursing intellectual capital theory has been used in research to test its ability to be used to evaluate the various levels of nursing professionals, the knowledge they hold, and its effect on patient care (Covell & Sidani, 2013). In that study, there were difficulties in operationalizing the relational capital. This means that there was need for more research especially in health to shed some light on its applicability in other fields other than management.

The theory can be transposed in health systems management. Whence, universal health coverage has been emphasized by the current Kenyan government, as part of is big four agenda. It has further supported it through equipment and financing at the expense of intellectual capital but its effectiveness may not be fully realized. Thus, focus on intellectual is fundamental and more so in provision of preconception care. The intellectual capital theory was used in this study to assess the capacity of the health facilities in Kisumu County of Kenya to provide preconception care. The concept and framework of IC provide a way to investigate the value of tangible and intangible resources, as well as their mutually beneficial interactions on organizational success. Furthermore, to figure out how to systematically handle these resources such that efforts around these various elements are optimized and synergistic (Evans et al., 2015).

The intellectual capital theory used in this study provided a means of studying patient factors, care team factors, health facilities as organizations factors and the immediate environmental factors specific to PCC service provision. These factors can easily be

manipulated to influence improved PCC service delivery. Therefore, it provided a framework and independent variables to measure these different levels of the health care system within the study area.

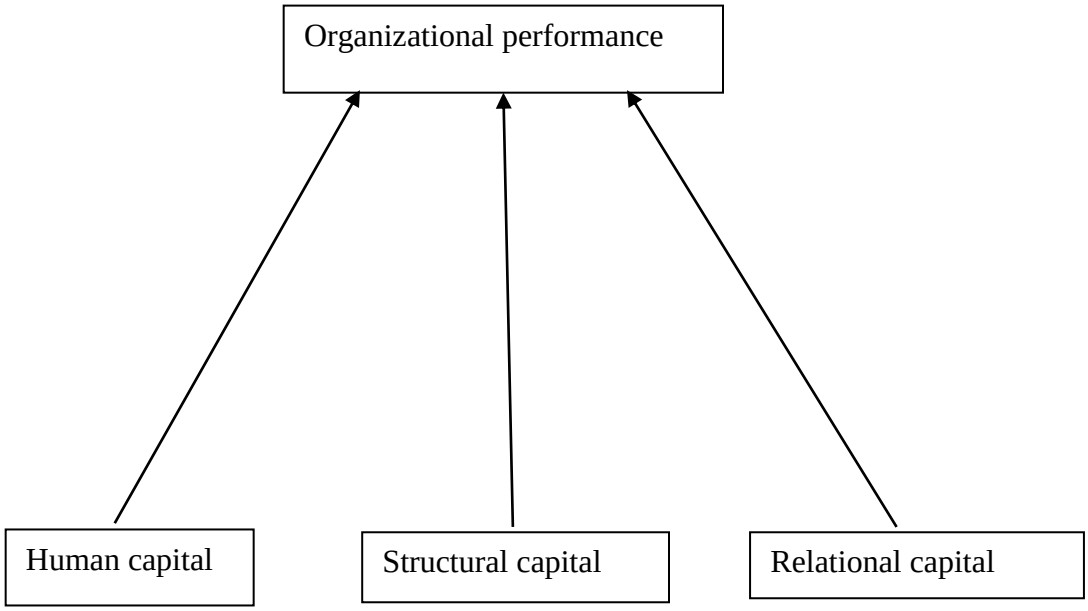

Figure 2.4. Intellectual capital framework (Terner & Halilovic, 2017)

The three components of intellectual capital in this model are the independent variables while organizational performance was the dependent variable, which in this study was the provision of preconception care.

2.7.4 Justification of the Model

Intellectual capital can affect and be affected by the unique culture of a system and the distinct processes and relationships that evolve within it. This propensity for complexity

suggests that a rigorous approach to managing, measuring, and reporting on the intellectual capital within the firm would require a number of measures to evaluate the intellectual capital of the firm. Whereas intellectual capital theory has been used in the field of management there is a shift towards testing its applicability in health, although most of this has been done in Asia and Europe (Covell & Sidani, 2013; Evans et al., 2015; Gardner & Gardner, 2001). Intellectual capital concept and framework in health care organization is relatively new and underdeveloped thus the opportunity for researchers to contribute to scholarship (Evans et al., 2015), more so in Africa where it has received little attention.

Literature reveals that Intellectual Capital (IC) encourages performance. Sharabati et al. (2010) concluded that IC has significant and positive impact on performance and was also echoed in another study (Sharabati, Ahmad, Shawqi, & Bontis, 2010). Intellectual Capital (IC) has significant and positive effect on corporate performance argued (Chen, Zhu, & Yuan, 2004). Ming-Chen (2005) pointed out that value creation competency is more positively encouraged by investment on human capital (Chen, Cheng, & Hwang, 2005). It is therefore, known that any system with a good capacity for intellectual capital has an enabling environment for performance. Intellectual Capital has potential for both complexity and diversity, thus developing measurement tools for intellectual capital remains one of the key challenges for the health fraternity. Despite the challenges in intellectual capital measurement, it is important to measure its status in any organization as it is approximation gauges performance (Subramaniam & Youndt, 2005). It's recognized that there is a wide variety of precedents and principles currently available to assist in the management of the

human, organizational and customer capital of any entity but IC cohesively and simply shows the interaction of its three key constructs.

The literature reviewed suggested lack of reliable evidence for determining factors influencing preconception care service provision in the current study setting. This severely threatens the prioritization, success and sustainability of vital preconception care initiatives (Gage et al., 2005). However, evaluating the capacity of the system will give overall direction on how well they are implemented and recommend room for improvement. This study therefore utilized intellectual capital model as its theoretical framework as it helps in gauging performance by directly profiling the capacity of the health care system in terms of its human, relational and structural capital.

2.8 Conceptual Framework

So that health facilities effectively implement preconception care activities they have to invest in both tangible and intangible resources for provision of preconception are. The tangible assets including infrastructure and super skilled human resource can be shared across the other health services but intangible assets are specific to preconception care and other related services. In this study the intangible assets were conceptualized as the three components of the intellectual capital framework while, organizational performance was adapted to refer to the rate and use of preconception care provision. The three components were; - human capital, structural capital and relational capital and were operationalized as per Figure 2.5 and Table 2.1.

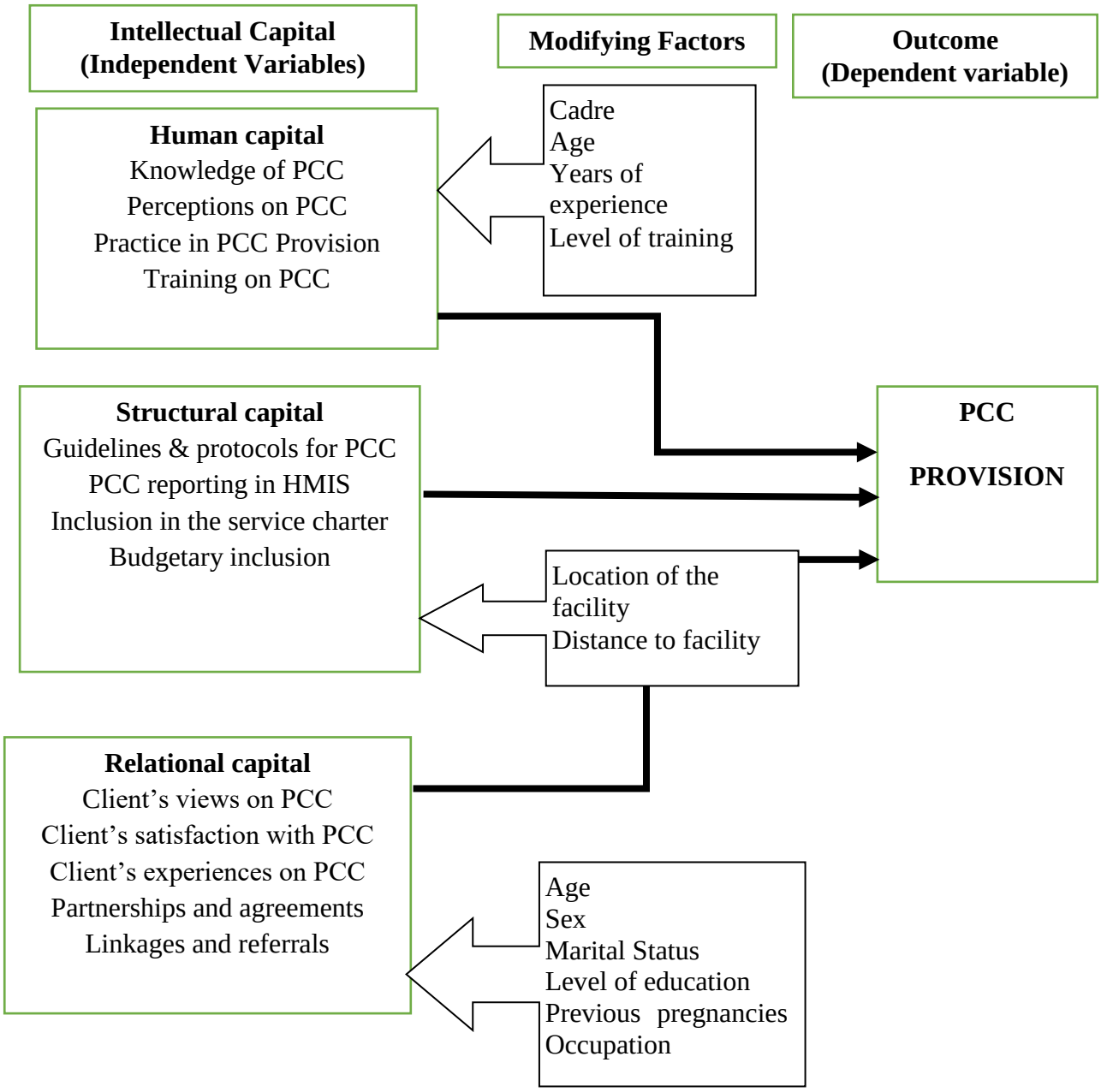

Figure 2.5. Conceptual framework

Table 2. 1. Conceptualization of the theoretical framework

VARIABLE	DEFINITION	COMPONENTS
Human Capital	Knowledge, skills and experiences owned and used by individual health workers	• Staffing and skills mix of health providers • Knowledge on preconception care for each cadre of service providers • Perceptions on the importance of preconception care • Their practice in implementation of this care • Trainings on preconception care
Structural Capital	Institutionalized knowledge and codified experience stored in databases, procedures, and the organizational culture of the health facilities	• Inclusion of preconception care in the Vision, mission, values, strategic plan • Availability of fliers and poster s to alert the public of the preconception services • Availability and use of guidelines or checklists for preconception care • Documentation of preconception care practices • Allocation of time to preconception care • Diagnostic tools to detect infections • Information systems • Protocols for provision of care • Routines • Referral structures for specialized care
Relational Capital	Knowledge available through networks of relationships internal and external to the health facilities	• Clients' awareness on preconception care • Client's experience or practice on preconception care • Policy orientation • Availability of partnerships with other service providers or with government, research institutions, consultants, etc.

2.9 Summary and Research Gap

Intellectual capital has a significant positive relationship with service delivery (Singh et al., 2016) but has not been rigorously studied in health care. Studies of IC in health care failed in operationalizing relational capital (Covell & Sidani, 2013). Studies have shown that provider knowledge and perception, which form human capital, influences PCC provision but have not shown how it is influenced by structural and relational capital (Chang & Hsieh, 2011; Mpaata et al., 2017; Shahzad et al., 2014). There were limited studies that had been done to measure IC in preconception care.

Preconception care implementation requires an innovative multipronged approach consisting of diverse strategies that integrate health and other social disciplines. Globally the prevalence of preconception care engagement remains sub-optimal (Steel et al., 2015), however, it had not been estimated in the current setting.

Studies have shown the perception of GPs on PCC provision but no other cadres of health providers like nurses, nutritionists among others (Mazza et al., 2013). Health provider knowledge, perceptions and practice have not been established in the current setting. Preconception care interventions have been identified and some countries have managed to package them to ease provision (Dean et al., 2012; Mason et al., 2014). Unfortunately, in the current setting there are no tailored packages for provision of preconception care.

Reproductive health clients who are preconception care customers, their knowledge and attitudes are paramount in PCC service delivery. Little is known about level of awareness and their readiness or lack of it in seeking these services in Kisumu County and Kenya as a

whole. Furthermore, linkages, referral systems and partnerships increase accessibility of PCC services. The availability of linkages and referral systems in this current setting has not been documented.

The literature reviewed suggested lack of reliable evidence for estimating rate of preconception and determining factors influencing preconception care service provision in the current study setting. This lack of reliable evidence for determining causality between an intervention and impact severely threatens the prioritization, success and sustainability of vital initiatives like preconception care (Gage et al., 2005). Evaluating the intellectual capital of the facilities will give overall direction on how well the preconception care is implemented and recommend room for improvement. This study therefore utilizes intellectual capital model as its theoretical framework as it helps in gauging performance by directly profiling the capacity of the health care system in terms of its human, relational and structural capital.

CHAPTER THREE
METHODOLOGY

3.1 Study area

The study was carried out at facilities in Kisumu County. Kisumu County is one of the new devolved counties of Kenya (Appendix 2). Its borders follow those of the original Kisumu District, one of the former administrative districts of the former Nyanza Province in western Kenya. Its headquarters is Kisumu City. It covers an area of 805 square miles, and has population of 968,879 (KNBS, 2009). It has 7 sub-counties, namely, Kisumu West, Kisumu Central, Kisumu East, Seme, Muhoroni, Nyando and Nyakach. Kisumu County has a total of 129 public health facilities.

Table 3.1. Number of facilities according to KEPH level and ownership

KEPH LEVEL	GOK (MOH)
2	72
3	34
4	22
5	1
Total	129

*Source; (**www.kmhfl.health.go.ke**, accessed on 26th April 2019)*

3.2 Study design

This was a descriptive and analytical cross-sectional study. Cross-sectional studies are used to assess the burden of disease or health needs of a population and are particularly useful in

informing the planning and allocation of health resources. Since no similar studies have been done on this area it provided an opportunity to generate hypothesis. Further the objectives of this study did not require repeated responses and could be achieved with information taken at one point in time. Objective one was descriptive while two, three and four entailed demonstration of a causal inference. The study used mixed method approach to build synergy on the strengths of both qualitative and quantitative methods. Quantitative data was collected first and then qualitative data was collected to triangulate the results from the former. Further a combination of these methods overcomes the weakness of either method if used independently.

3.3 Study and target population

The respondents were reproductive health service providers and users within the facilities under study.

Table 3.2. Current health worker statistics per cadre (County Health records accessed on 20th April 2018)

SNO	CADRE	GOK
1.	Medical Officers	117
2.	Clinical Officers (Gen.)	174
3.	Nursing officers	878
4.	Nutritionists	8
5.	Lab technicians	141
	TOTAL	1318

The ‘users’ were women of children-bearing age with a reproductive intention. These women were seeking reproductive care services at these facilities during the period of the

research. These services included; - antenatal care, postnatal cares, well child health service gynecological care and childbirth.

3.3.1 Inclusion criteria

The inclusion criteria for health providers were; -

- Must be a nurse, doctor, clinical officer, laboratory technician or nutritionist
- Those who were working in labour wards, postnatal wards, gynecology wards, female wards as well as maternal and child welfare clinics
- Those gave consent to be interviewed

The inclusion criteria for clients; -

- Women above the age of 18 years and are equal or less than 49 years
- Seeking services at the facilities during the study period
- Those who consented to be interviewed

3.3.2 Exclusion criteria

The exclusion criteria for health providers

- Health providers who don't fall in categories identified (nurse, doctor, clinical officer, laboratory technician or nutritionist)
- Refusal to give consent

The exclusion criteria for clients; -

- Refusal to give consent

3.4 Sample size determination

In estimating the sample size from a sampling frame of 129 health facilities, the following formula was used (Sarmah, Hazarika, & Choudhury, 2013).

$$n = \frac{Z^2pq}{d^2}$$

Where,

n = the estimated number of clients to be interviewed

Z = confidence interval width at 95% level which is equivalent to 1.96

p = proportion of the characteristic under study. (The proportion of the study population who offer preconception care, p=43 rate from a previous study)

q = 1-p

d = is the error term which is estimated at 0.05

Therefore,

$$n = \frac{1.96 \times 1.96 \times 0.43 \times 0.57}{0.05 \times 0.05} = 376.6 = 377$$

$$N = \frac{377}{1+\frac{(377-1)}{129}} = \frac{377}{4.19} = 27.7$$

Thus, a sample size of n=28 health facilities arrived at.

In Kisumu County, the population of women in childbearing age is 346,068(Kenya National Bureau of Statistics et al., 2015). The sample size of clients was determined by the following formula

$$n = \frac{Z^2pq}{d^2}$$

Where,

n = the estimated number of clients to be interviewed

Z = confidence interval width at 95% level which is equivalent to 1.96

p = proportion of the characteristic under study (The proportion of the study population who offer preconception care, p=43 rate from a previous study)

q = 1-p

d = is the error term which is estimated at 0.05

Therefore,

$$n = \frac{1.96 \times 1.96 \times 0.43 \times 0.57}{0.05 \times 0.05} = 376.6 = 377 \text{ clients}$$

Further, the minimum sample size for the health workers was derived in similar manner where the population of health workers was 1318 (County health records).

$$n = \frac{Z^2pq}{d^2}$$

Where,

n = the estimated number of health workers to be interviewed

Z = confidence interval width at 95% level which is equivalent to 1.96

p = proportion of the characteristic under study (The proportion of the study population who offer preconception care, p=43 rate from a previous study):

q = 1-p

d = is the error term which is estimated at 0.05,

Therefore,

$$n = \frac{1.96 \times 1.96 \times 0.43 \times 0.57}{0.05 \times 0.05} = 376.6 = 377$$

Since the health provider population was a finite population, the formula was corrected as follows:

$$N = \frac{377}{1+\frac{(377-1)}{1318}} = \frac{377}{1.19} = 317 \text{ health providers}$$

To ensure reliability of the results, simple random sampling is recommended and if not a sample size twice as would be needed under simple random sampling should be used (Salganik, 2006). Previous studies have recommended the use of design effect factor (deff) of 1.5 as a bench mark in respondent driven sampling (Hulland, Blanton, Leidman, & Bilukha, 2016). Deff is a measure that compares the ratios of sampling variance from the actual stratified sample to simple random sampling. This study employed stratified and purposive sampling. Thus, this could have introduced a sampling error. To correct this, the calculated sample sizes of n=377 and n=317 were multiplied by 1.5 to arrive at n=565 and n=476, respectively.

3.5 Sampling technique

The study employed multistage sampling. First, stratified sampling was done, whereby the 7 sub-counties served as strata. Purposive sampling was used to select 2 high volume dispensaries, health center, and sub-county hospitals from each sub-county (Table 3.3).

Table 3.3. Number of facilities sampled per category

CATEGORIES	LEVEL	NO
Dispensaries	2	12
Health centers	3	7
Sub-County hospitals	4	7
County hospitals	4	1
County referral hospitals	5	1
Total		28

To arrive at the health provider sample, proportionate sampling of the cadres was done based on Table 3.2, as depicted on Table 3.4.

Table 3.4. Proportionate samples of health workers

SNO	CADRE	TOTAL	SAMPLE SIZE
1	Medical Officers	117	42
2	Clinical Officers (Gen.)	174	63
3	Nursing officers	878	317
4	Nutritionists	8	3
5	Lab technicians	141	51
Total		**1318**	**476**

Systematic sampling was done to sample the clients who were potential user of PCC. Whereby, every nth client who met the inclusion criteria in each service delivery points in the facilities visited was approached and if consent was obtained, she was interviewed. The nth number was derived from the average number of clients seen daily for the previous one month in each facility visited. This service delivery points included; - labour wards, postnatal wards, gynecology wards, female wards as well as maternal and child welfare clinics.

3.6 Data collection

For data collection, 3 tools were used. Checklists and questionnaires were used to collect quantitative data while qualitative data was collected using focused group discussions. The checklist (Appendix 3) was used to document the routine interactions between clients and health providers, availability of guideline and job aids and supplies for provision of preconception care for each of the facilities, which were sampled. Self-administered questionnaires were used to collect quantitative data from the health workers (Appendix 4) while exit interviews were done for clients seeking care during the period of the study (Appendix 5). Focused group discussions were done for clients and health workers (Appendix 6 & 7). These tools were used to meet each objective as further explained below.

3.6.1 Objective 1: The rate of preconception care provision

The study first sought to elicit the prevalence of use of preconception care. This was derived first with the questionnaire for staff, where the response for the question, 'have you ever provided preconception care' was considered. Then, the Facility Checklist (Appendix 3) had a list of preconception care interventions whose availability was used to draw a conclusion. The checklist required a response of *yes* or *no* as to whether the particular services were being provided or not. The mean of the proportions of interventions provided was presumed to be the rate of preconception care provision.

3.6.2 Objective 2: The influence of the human capital on provision of PCC

Data to measure the human capital was collected using self-administered questionnaires. This questionnaire was adopted from a previous study in Ethiopia as alluded to earlier

(Kassa et al., 2019). The variables which were elicited as depicted on the conceptual framework were; - Level of training, Knowledge of PCC for each cadre, Perceptions on PCC, Adequacy of Training on PCC.

The level of training was elucidated by a prompt in the questionnaire. In the questionnaire, the health care providers were asked to list at least 5 PCC interventions. Level of knowledge was assessed against the 5 responses with the highest being 5 correct responses and lowest 0-1 correct response. The attitude was measured using a Likert scale where the health workers were asked questions on their perception on the importance of preconception and their perceived competence on at least 5 intervention. The Likert scale had 5 options ranging from strongly agree to strongly disagree. Data from the questionnaires was further augmented by a focused group discussion (see Appendix 6 and 7).

3.6.3 Objective 3: The influence of structural capital investment on provision of PCC

Data was collected using a checklist that was answered by key informants (nursing officer in charge of facilities and reproductive health department heads) in each of the facilities sampled. The variables contained in these tools were; -Inclusion of preconception care in the service delivery charter, Availability of fliers and poster s to alert the public of the preconception services, Availability and use of guidelines or checklists or protocols for preconception care, Documentation of preconception care practices (inclusion in the HMIS), Allocation of resources to preconception care (budgeting).

3.6.4 Objective 4: The effect of relational capital on provision of PCC

To achieve this objective, the checklist was used to elicit the availability of partners, linkages and referral structures to support PCC provision. The women of childbearing age who had come to seek reproductive health services represented the PCC clients. Data on clients' satisfaction on services provided, clients awareness of preconception care and readiness to receive PCC if provided was elicited using the exit interviews. The interviews were in form of short interviewer administered questionnaires.

3.7. Instruments development

The facility checklist was based on the suggested PCC package intervention as published by the WHO expert team (Dean et al., 2013) and a checklist of clinical issues of preconception published by New York state department of health (ACOG, 2013). The questionnaire was adopted from a previous study in Ethiopia (Kassa et al., 2019). They were tested in two facilities which were not sampled then refined by the research team. Since Kisumu central has one County hospital and one County referral facility, two dispensaries from this sub-county were used for pretesting. The questionnaires (Appendix 4) were in English, while exit interview questionnaires were translated into Kiswahili and Dholuo to promote understanding and the responses translated into English.

3.7.1 Reliability of the instruments

The checklist had closed ended prompts which expected NO and Yes responses. Further the research team was trained and involved in the instrument development to ensure mastery of the content. The health provider questionnaire was adopted from a previous study in

Ethiopia that had an internal consistency score of 0.945 based on Cronbach's α test (Kassa et al., 2019). The FGD guide was developed procedurally with three sections (Appendix 6). That is, the opening, exploration and closing sections. The questions on the explorative section were aimed at eliciting responses that could delude to barriers and enablers of preconception care provision.

3.7.2 Validity of the instruments

To ensure validity, the checklist was made comprehensive and systematic following the Table of issues and recommended interventions in the PCC package (Appendix 1). As mentioned above the questionnaire was adopted from a previous study and had content validity index (CVI) of 92.4. To promote generalizability of the information, all levels of formal health service delivery system of Kenya were considered. This was through inclusion of the Kenya Essential package for health level 2, 3, 4, and five during sampling. Moreover, only public health facilities were included to ensure a reflection of the true picture of what is happening in an otherwise 'normal situation'. Two focused group discussions were conducted to triangulate the results for objective 2, 3 and 4.

3. 8 Data Collection Procedures

In this section, the procedures that were followed to collect data using the instruments mentioned above are described.

3.8.1 Questionnaire administration

Upon identification of the health provider respondent, consent was sought after allowing them to read the information sheet. If they consented to participate in the study, they were

requested to append their signature on the consent forms. Then, each health provider was allowed to decide the appropriate time for him or her to fill the questionnaire. Thereafter the research assistants were able to pick the questionnaires and serialised them.

3.8.2 Observation checklist

Upon entry to the health facilities, the research assistant requested direction as to who could be appropriate to assist in getting information to fill the checklist. In most facilities these were the nursing officers in charge of the maternity units or the nursing officers in charge of the facilities. Then, information was given and the research assistant went forth to ask the questions, observe and fill out the response as per the prompts in the checklist.

3.8.3 Exit interviews

Every client seeking care at the reproductive service provision areas was approached. Information was given and consent sought. If they consented, they were requested to indicate their initials on the consent forms. Then, they were prompted to respond to the questions on the exit interview tool and the research assistant recorded the responses.

3.8.4 Focus group discussion

A focus group discussion guide was used to conduct focus group discussions. Two focus group discussions were conducted. This was because the information sought was for triangulation and data saturation was not a goal. Studies have shown that 80% of the themes in focused group discussion are discoverable in 2 to 3 discussions. Separate focus group sessions were conducted, 2 for community health workers and 2 for health providers' respondents. The health provider group was composed of nurses because it was the only

cadre that was involved in provision of all the PCC interventions and for homogeneity. Each group comprised of 8 discussants and a moderator. Focus groups sessions were conducted until no new information was generated. The conversation was recorded and later transcribed.

3.9 Data analysis

The self-administered questionnaires were checked for completeness. Data forms were created with Epi Info version 7 (CDC, Washington DC, USA), verified and cleaned. It was then exported to SPSS version 21.0 (IBM, USA) where both descriptive and inferential analysis were performed.

3.9.1 Objective 1

Proportions of the *yes* and *no* response, on whether each of the interventions for each service in the package as per the checklist was provided, were calculated and presented as percentages. Then, the means for all of the services in the package was determined. The significance of the difference in the means was determined by the one sample T-test at *P*-value of equal to or less than 0.05. This is because the sample size of 28 facilities met the criteria of this test statistic. Further the rate of use was derived from the proportion of women that each health provider indicated they had given care. The data was presented in form of tables and descriptions.

3.9.2 Objective 2

For objective two, descriptive statistics were presented in contingency tables with counts and proportions. Bivariate analysis was done on level of knowledge and practice. The

differences in proportions of the other variables were determined by the Chi-square statistic where significance was set at *P*-value of ≤ 0.05. Variables with significant *P*-value were fitted into a multilinear logistic regression analysis to adjust for confounders and thus determine their influence on provision of PCC provision. The strength of the association was measured by the odds ratio and 95% confidence interval. Further the independent sample T test was used to show the significance in the differences in means for the various characteristics of the health care providers.

Thematic analysis technique was used for the FGD data. Information from the focused group discussion of the health providers were transcribed and reported verbatim. Then the researcher read through and selected the phrases, sentences and paragraphs that were related to the research questions. From these phrases, sentences and paragraphs, themes were identified. The phrases were then organized according to the themes. Then it was summarized according to themes and conclusions were drawn.

3.9.3 Objective 3

For this objective, descriptive statistics was done and presented in contingency tables. Bivariate analysis was performed on the variables earlier mentioned on the section "data collection". The student T test was used to test the significance of the differences in the means. Similarly, significant values were regressed against provision of preconception care, to show the strength of the association structural capital characteristics and PCC provision at $P \leq 0.05$.

3.9.4 Objective 4

Finally, the client's satisfaction was measured by a prompt requiring them to say whether they were satisfied or not. Similarly, they were asked to state whether they were willing to use the various interventions/services in the PCC package. The proportions of these responses were determined and presented in tables. The chi-square statistic was used to determine the influence of the various clients' characteristics on satisfaction with services provided and readiness to receive care if provided, at $P \leq 0.05$.

Similar to that of the health providers, information from the focused group discussion of the women was transcribed and reported verbatim. Then the researcher read through and selected the phrases, sentences and paragraphs that were related to the research questions. From these phrases, sentences and paragraphs, themes were identified. The phrases were then organized according to the themes. Then it was summarized according to themes and conclusions were drawn.

3.10 Logistical considerations

Permission to conduct the study was sought from the MMUST School of Graduate studies (SGS) (Appendix 8), National Council for Science and Technology (NACOSTI) (Appendix 9), and the County Director of Medical Services (Appendix 10). Ethical clearance was sought from the MMUST Ethics and Research Committee (Appendix 11) and JOOTRH Ethics and research committee (Appendix 12).

3.11 Ethical considerations

The study did not involve any invasive or risky procedures. In carrying out the study, informed consent was sought with full information being provided and comprehension being affirmed (Appendix 13). Confidentiality was ensured through anonymity (using unique numbers), privacy during interviews and withdrawal at any point was allowed. For further inquiry into the research the respondents were provided with the contacts of the principal investigator. The questionnaires were archived soon after data entry. During analysis personal identifiable information was coded. Spreadsheets were password-protected and encrypted. Facility names and key informants' names were not used during reporting.

CHAPTER FOUR
FINDINGS

4.1 Introduction

This chapter contains the response rate, demographic attributes of the respondents and the respondents' answers to various statements and questions with regard to the study.

4.1.1 Response rate

All of the 28 facilities sampled were accessed during the period of study. A total of 28 facilities were involved in the study with 50% (14) of the facilities being inpatient service providers and the rest both in patient and out-patient service providers. Most of the facilities 64.3% (18) were in the rural setting while the rest 35.7% (10) came from urban setting (Table 4.1).

Table 4.1. Health facilities' characteristics

	Frequency	Percent
Both Out and Inpatient	14	50.0
Out Patient	14	50.0
Rural	10	35.7
Urban	18	64.3

A total of 475 reproductive health workers responded to the questionnaire out of the sample of n=476. The resulting response rate was 99.8%. For the clients every client approached and gave consent was interviewed until the sample size was attained.

4.1.2 Demographics

Table 4.2 presents the demographic characteristics of the health care provider respondents. The mean PCC engagements reported were 3.7. When stratified into those who reported having had ≤ 3 PCC engagements for every 10 clients seen verses those who had >3, there was a significant difference between the cadres and facility levels. The stratification was based on the mean PCC engagements.

Table 4.2. Demographic characteristics of health providers and number of PCC engagements

Characteristics	Grouping	Preconception engagements		Total	P value
		≤ 3	>3		
Age (Years)	≤30	46 (106)	54 (125)	49 (231)	0.612
	Above 30	44 (105)	56 (136)	51 (241)	
	Total	45 (211)	55 (261)	100 (472)	
Marital status	Married	44 (143)	56 (180)	69 (325)	0.749
	Not Married	46 (67)	54 (80)	31 (147)	
	Total	44 (210)	54 (260)	100 (472)	
Sex	Male	46 (59)	54 (69)	27 (128)	0.716
	Female	44 (153)	56 (193)	73 (346)	
	Total	45 (212)	55 (262)	100 (474)	
Cadre	Nurse	46 (123)	54 (142)	56 (265)	**0.013**
	Doctor	21 (8)	79 (30)	8 (38)	
	C.O	53 (40)	47 (35)	16(75)	
	Nutrition	48 (23)	52 (25)	10 (48)	
	Lab Tech	37 (18)	63 (31)	10 (49)	
	Total	45 (212)	55 (263)	100 (475)	
Level of Education	Certificate	43 (3)	4	1 (7)	0.867
	Diploma	46 (139)	165	64 (304)	
	Degree	43 (69)	90	33 (159)	
	Masters	20 (1)	4	1 (5)	
	Total	45 (212)	263	100 (475)	
Experience2	≤ 5 years	47 (112)	53 (127)	51 (239)	
	> 5 Years	43 (98)	57 (130)	49 (228)	

Characteristics	Grouping	Preconception engagements		Total	P value
		≤ 3	>3		
	Total	45 (210)	55 (257)	100 (467)	0.400
Sub-county		2	0	2	0.505
	Gem	36 (5)	64 (9)	3 (14)	
	Kisumu	44 (165)	56 (210)	78 (375)	
	K. West	58 (7)	42 (5)	3 (12)	
	Muhoroni	56 (10)	44 (8)	4 (18)	
	Nyakach	31 (4)	69 (9)	3 (13)	
	Nyando	45 (14)	55 (17)	7 (31)	
	Seme	50 (5)	50 (5)	2 (10)	
	Total	45 (212)	55 (263)	100 (475)	
Facility Level	Level 2& 3	52 (58)	48 (54)	24 (112)	**0.049**
	Level 4 &5	42 (152)	58 (207)	76 (359)	
	Total	45 (210)	55 (261)	100 (471)	

Data is in proportions, counts in brackets. C.O-clinical officer. Statistical significance determined by x^2 at P≤0.05. K- Kisumu.

A total of 556 clients seeking care at the 28 health facilities sampled during the study period were interviewed and their distribution according to health facility level is summarized in Table 4.3.

Table 4.3. Clients interviewed per level of facility

Facility Level	Age Group		Total
	25 and Below n (%)	Above 25 n (%)	**n (%)**
Level 2	10 (58.8)	8 (41.2)	**18 (3.06)**
Level 3	66 (58.3)	48 (41.7)	**114 (20.68)**
Level 4	104 (53.6)	88 (46.4)	**192 (34.53)**
Level 5&6	132 (56.5)	100 (43.5)	**232 (41.73)**
Total	**312 (55.9)**	**244 (44.1)**	**556 (100)**

Most of the respondents were aged below 25 years of age 55.9% (n=311), were unemployed 56.8% (n=316), were urban residents 58.6% (n=326) and were married 77.8% (n=432). These among other social demographic characteristics are summarized in the Table 4.4.

Table 4.4. Clients' socio-demographics characteristics

Characteristic	**Grouping**	**Facility level2**		**Total**
		Level 2 and 3	Level 4 and 5	
Age Group	25 and Below	77 (24.8)	234 (75.2)	311 (55.9)
	Above 25	55 (22.4)	190 (77.6)	245 (44.1)
	Total	132 (23.7)	424 (76.3)	556 (100)
Occupation	Employed	60 (25)	180 (75)	240 (43.2)
	Unemployed	72 (22.8)	244 (77.2)	316 (56.8)
	Total	132 (23.7)	424 (76.3)	556 (100)
Residence	Rural	77 (33.5)	153 (66.5)	230 (41.4)
	Urban	55 (16.9)	271 (83.1)	326 (58.6)
	Total	132 (23.7)	424 (76.3)	556 (100)
Education	Secondary & above	87 (22.8)	295 (77.2)	382 (69.3)
	Primary	43 (25.4)	126 (74.6)	169 (30.7)
	Total	130 (23.6)	421 (76.4)	551 (100)
Average Monthly Income	Above 5000	25 (24.3)	78 (75.7)	103 (51.8)
	5000 & Below	25 (26)	71 (74)	96 (48.2)
	Total	50 (25.1)	149 (74.9)	199 (100)
Marital Status	Married	103 (24)	327 (76)	430 (77.8)
	Not Married	28 (22.8)	95 (77.2)	123 (22.2)
	Total	131 (23.7)	422 (76.3)	553 (100)
Previous pregnancies	More than 1	99 (25.2)	294 (74.8)	393 (78.6)
	None	24 (22.4)	83 (77.6)	107 (21.4)
	Total	123 (24.6)	377 (75.4)	500 (100)

The study sought collaborate the findings from the questionnaires and checklists and on the influence of intellectual capital on preconception care service delivery, two FGD were conducted. The first focused group (FGD) was composed of 11 nurses who were representing several facilities within Kisumu east constituency. The second FGD was made up of community health volunteers attached to these facilities. It was made up of 8 members

who were able to communicate in English. The FGDs aimed at eliciting responses from the health workers about knowledge of preconception care, their perceptions of importance, the possibility of providing the care and challenges they faced in provision of this care. Community health workers FGD aimed at getting insight of the perceptions of the community as the external environment. The findings were presented in various relevant sections.

4.2 Objective 1: Preconception care provision in Kisumu County

4.2.1 Rate of provision of PCC

The PCC had 15 service packages (Appendix 1) that had several interventions under them that were observed for determination of PCC implementation in the facilities. All the interventions from all the service packs were adding up to 100, thus formed perfect denominator for percentage value determination of rate of provision. The fifteen service packs for PCC were as follows: Nutritional Management, Vaccination, Tobacco Use Prevention, Environmental Risk Exposure Reduction, Genetic Disorder Management, Planned Pregnancies, Sexually Transmitted Diseases Management, HIV Prevention and Management, Infertility and Sub-fertility management, Female Genital Cut Prevention and Management, Mental Health Disorders Management, Psychoactive Substance Use Prevention and Management, Intimate Partner and Sexual Violence Management, General Counselling and Diagnosing and Managing.

From the study it was realized that the reported provision of PCC was relatively high at 65%. It was found highest in Kisumu Central sub-county at 70% and lowest in Nyakach at

61%. The service pack most provided was sexually transmitted infections management and general counselling service pack at 100 % (N=28). The poorly performing services were Environmental risk reduction at 27 % (N=28) and diagnosis and treatment of chronic diseases at 35% (N=28). Details on the rate of provision are further profiled in Table 4.5.

Table 4.5. Rate of provision per sub-county

Sub-county	**Kisumu Central**	**Kisumu East**	**Kisumu West**	**Muhoroni**	**Nyakach**	**Nyando**	**Seme**	**Average**
Nutritional deficiencies and disorders	78	73	70	67	62	71	74	**71**
Vaccine-preventable infections	100	100	100	92	92	100	100	**98**
Tobacco use	45	40	35	25	40	36	27	**35**
Environmental risks	46	38	9	9	38	10	39	**27**
Genetic disorders	75	55	55	60	45	60	53	**58**
Early, unwanted and rapid successive pregnancies	78	86	86	73	75	80	85	**80**
Sexually transmitted infections	100	100	100	100	100	100	100	**100**
HIV	72	94	97	94	91	95	96	**91**
Infertility and sub-fertility	75	54	69	79	54	55	43	**61**
Female genital mutilation	55	20	25	35	25	20	20	**29**
Mental health disorders	51	40	47	36	36	44	53	**44**
Psychoactive substance use	64	51	59	45	37	52	41	**50**
Intimate partner and Sexual violence	79	93	93	86	86	94	95	**89**
General Counseling	100	100	100	100	100	100	100	**100**
Diagnosing and Managing chronic diseases	35	35	35	35	30	32	40	**35**
Total	**70**	**65**	**65**	**62**	**61**	**63**	**64**	**65**

4.2.2 PCC Implementation based on Intellectual Capital Matrix

Provision of each of the intervention of PCC as well as availability of the other intellectual capital aspects (relational and structural) formed the basis for delineating between level of implementation and level of provision. Level of implementation was ascertained by count

and average of the observations for each of the intellectual capital matrix for PCC care aspects while provision was just the count of one of observation of whether the PCC service was being provided or not.

Level of implementation of PCC was quite low at 39%. It was observed to be lower in the primary level facilities (KEPH level 2 and 3) at 34% and higher in referral facilities (level 4 and above) at 45%. The service with the highest implementation level was HIV prevention and Management 84% followed by sexually transmitted diseases at 80% and vaccination services at 75%. The service with lowest level of implementation was environmental risk exposure reduction at 13% for level 2 and 3 followed by management of mental health disorders as shown in Figure 4.1.

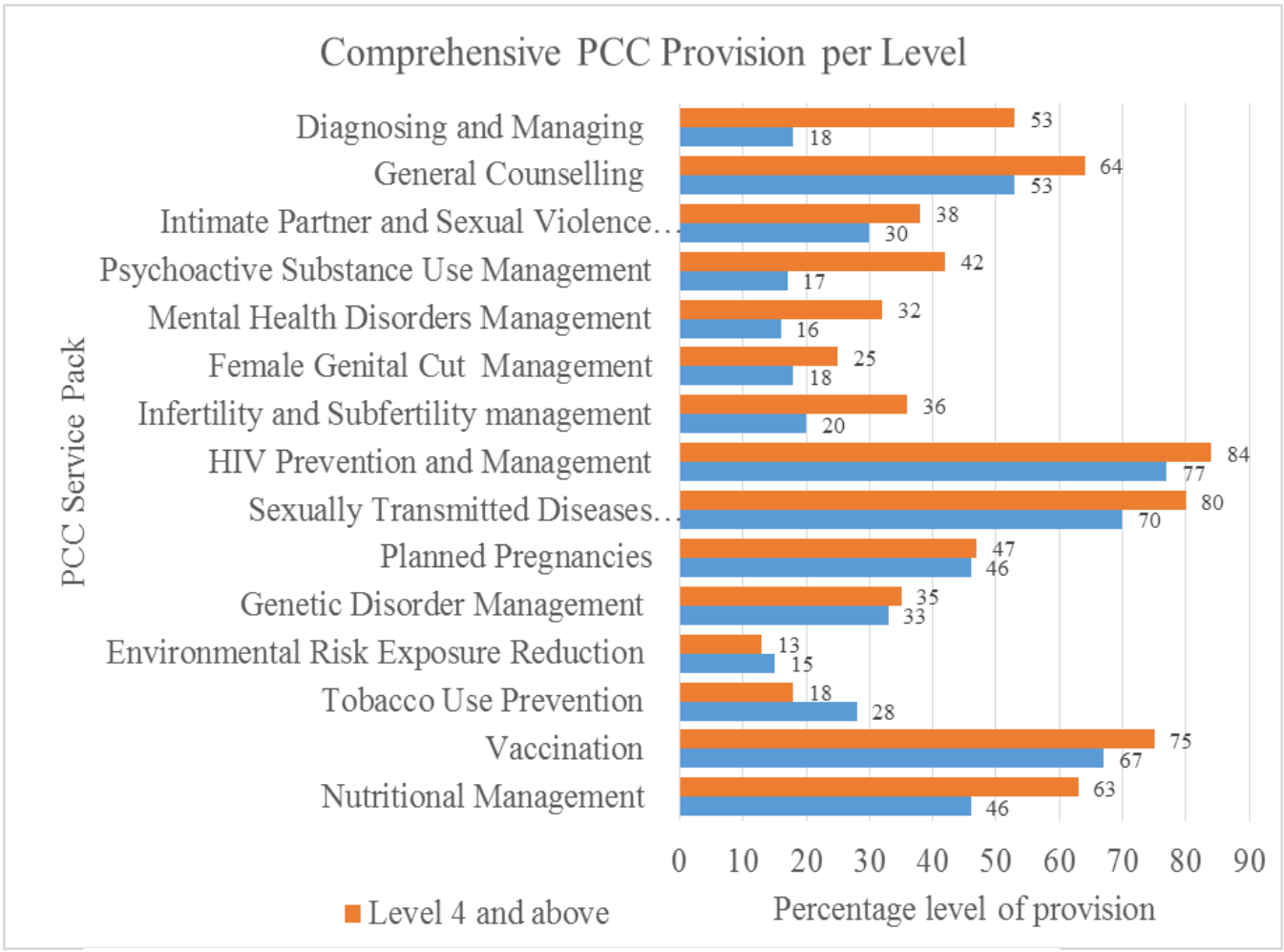

Figure 4.1. PCC prevention per service pack as per KEPH level of facilities

Detailed description of the performance of each service pack is provided in the next sub-sections.

4.2.3 Nutritional deficiencies and disorders management

Several interventions for the management of nutritional disorders and deficiencies were measured. They included screening for anemia, diagnosing and managing nutritional conditions, screening for diabetes, supplementing iron and folic acid, information, education

and counseling, monitoring nutritional status, management of diabetes, including counseling people with diabetes mellitus, promoting exercise and iodization of salt. Level 4 and above facilities had the overall best performance (79%) in this area. The aspects that were implemented dismally were: promoting exercise and iodization of salt, respectively (Table 4.6).

Table 4.6. Level of implementation of Nutritional interventions segregated as per level

Aspects of Nutritional Service Pack	**Level 3 and 2**	**Level 4 & above**
Screening for anemia	100	100
Diagnosing and Managing nutritional conditions	9	100
Screening for diabetes	100	100
Supplementing iron and folic acid	75	100
Information, education and counseling	9	100
Monitoring nutritional status	100	100
Management of diabetes, including counseling people with diabetes mellitus	0	100
Promoting exercise	0	7
Iodization of salt	0	0
Implementation	**44**	**79**

4.2.4 Vaccination against Vaccine-preventable infections

The interventions targeting these infections were; vaccination against rubella, vaccination against tetanus and diphtheria and vaccination against Hepatitis B, which are the vaccines of high, impact on the outcome of the pregnancy. All facilities provided hepatitis vaccination while vaccination for tetanus and pertussis was 100% in 4 and above. Rubella vaccine was only provided in some facilities across board (Figure 4.2).

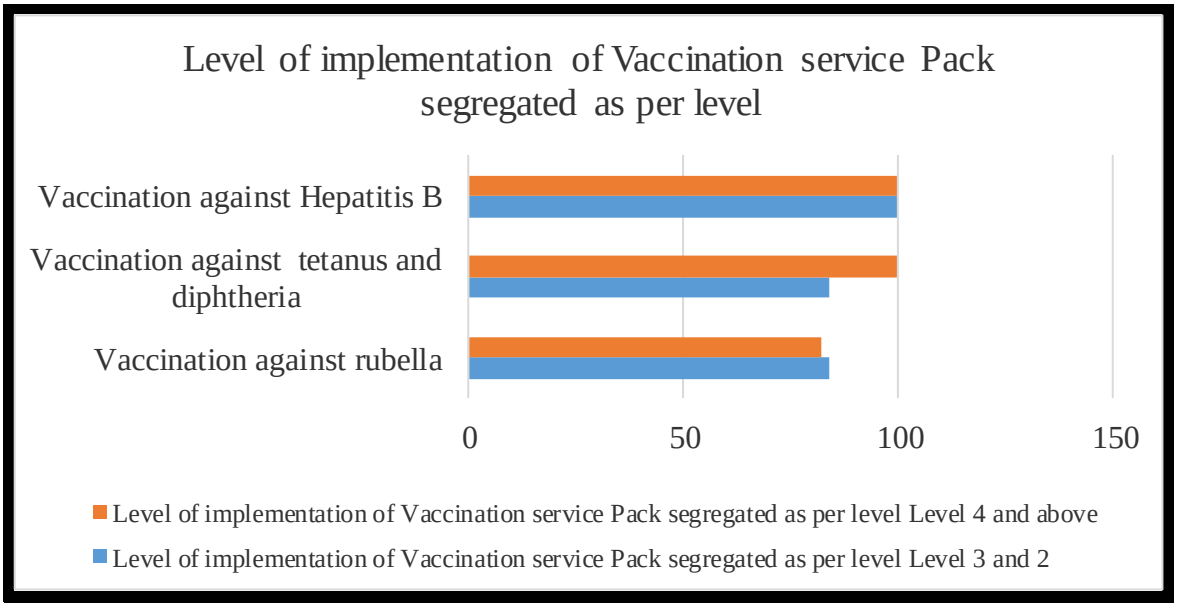

Figure 4.2. Level of implementation of vaccination interventions.

4.2.5 Prevention of tobacco use

Interventions to discourage tobacco use during preconception period were not implemented in Level 3 and below. In Level 4 and above, only screening of women and girls for tobacco use using "5 As" (ask, advise, assess, assist, arrange) was implemented at 7%. This accounted for approximately 1% of the intervention. This service pack contained other interventions including counseling on harmful effects of tobacco on pregnant women and unborn children, providing brief tobacco cessation advice, pharmacotherapy (including nicotine replacement therapy, if available), screening of all non-smokers and advising about harm of second-hand smoke and screening of women and girls for tobacco use.

4.2.6 The environmental risks exposure reduction

The interventions to minimize exposure to environmental risks were; information on radiation exposure in occupational, environmental and medical settings, provide protection from unnecessary radiation exposure, information provision on avoiding unnecessary pesticide use, protecting from lead exposure, informing women of childbearing age about levels of methyl mercury in fish and promoting use of improved stoves and cleaner liquid/gaseous fuels. The Environmental service pack was not implemented at all the KEPH levels.

4.2.7 The genetic disorders management

This pack had several interventions that the prospective family has to be taken through in PCC. These aspects were: taking a thorough family history to identify risk factors for genetic conditions, family planning, genetic counseling, carrier screening and testing and appropriate treatment of genetic conditions. Only family planning as PCC genetic service pack was implemented 100% at all levels.

4.2.8 Prevention of early, unwanted and rapid successive pregnancies

Several interventions aimed at prevention of unwanted pregnancies were implemented at level 4 and above alone. These were: keeping girls in school initiatives (7%), engaging men to critically assess norms and practices regarding gender-based violence and engaging men to critically assess norms and practices regarding coerced sex (13% each). Other key aspects like Influencing cultural norms that support delayed marriage and consensual sex and empowering girls to resist coerced sex were not implemented at all (Figure 4.3).

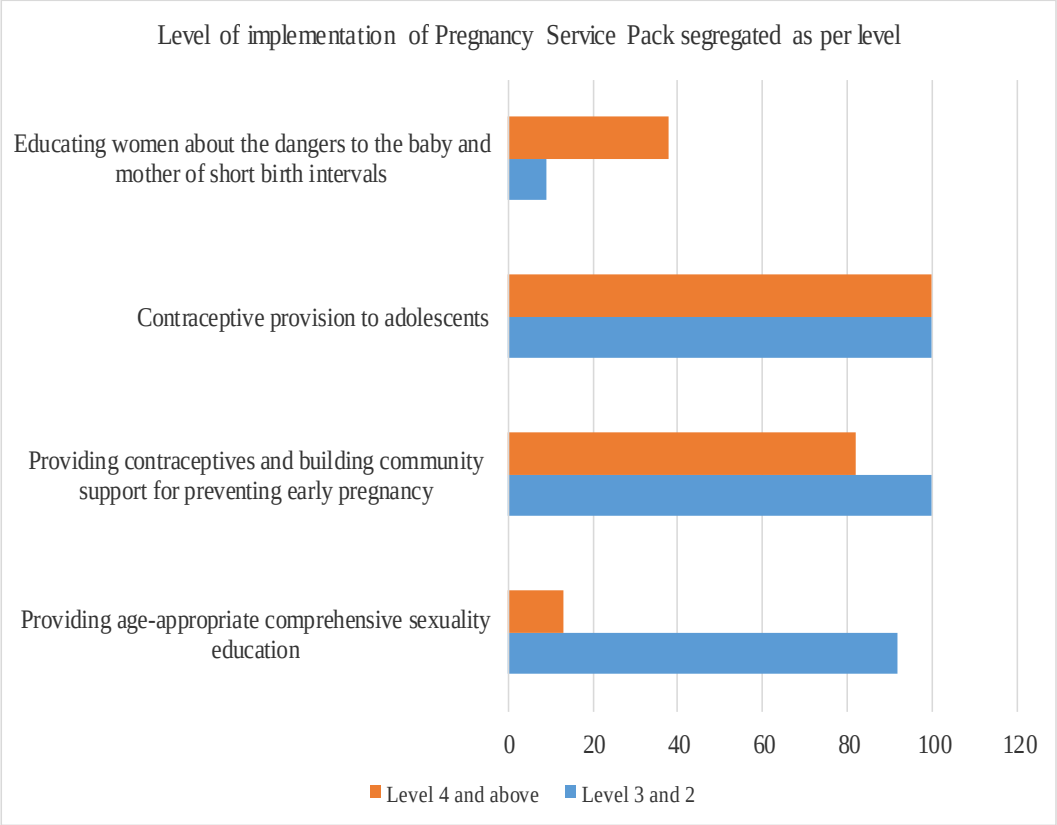

Figure 4.3. The unwanted pregnancy prevention service pack

4.2.9 Management of sexually transmitted infections

The sexually transmitted infection (STI) services were generally well implemented, several at 100% across all KEPH levels. These services were: diagnosing and treating STIs e.g., syphilis, gonorrhea and genital ulcer diseases, promoting condom use for dual protection against STIs and unwanted pregnancies, ensuring steady access to condoms and screening for STIs. Equally, promoting safe sex practices through individual, group and community-level interventions and STIs treatment and other relevant health services performed highly at 92% and 100% for lower and higher KEPH levels respectively and in the that successive

order. Only one service, providing age-appropriate comprehensive sexuality education and services performed dismally (Figure 4.4).

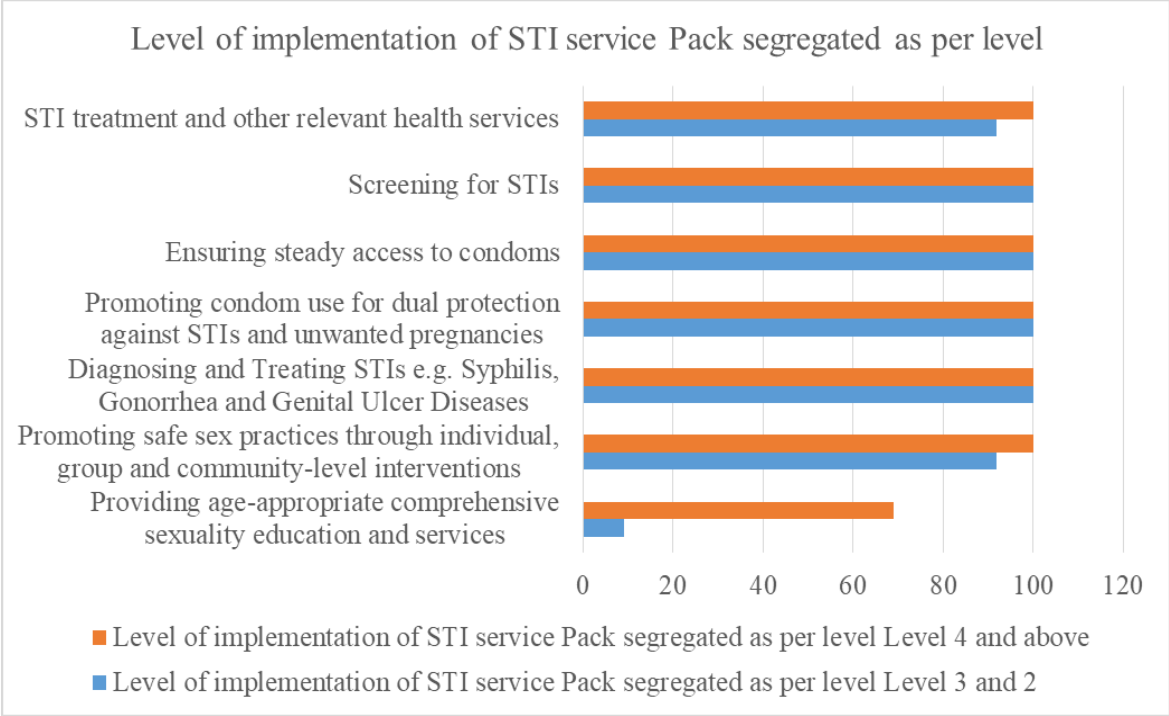

Figure 4.4. Level of implementation of STI management service pack

4.2.10 HIV-AIDS prevention and management

Seven of the eight services for the management of HIV were at optimum performance of 100%. These 7 were: family planning, provider-initiated HIV counseling and testing, including male partner testing, providing antiretroviral treatment (ART) for prevention of mother to child transmission of HIV, providing ART for pre-exposure prophylaxis, providing ART for post-exposure prophylaxis, providing male circumcision and determining

eligibility for lifelong antiretroviral therapy. Only promoting safe sex practices and dual method for birth control and STI control was at 92% for Level 3 and below and 75% for level 4 and above (Figure 4.5).

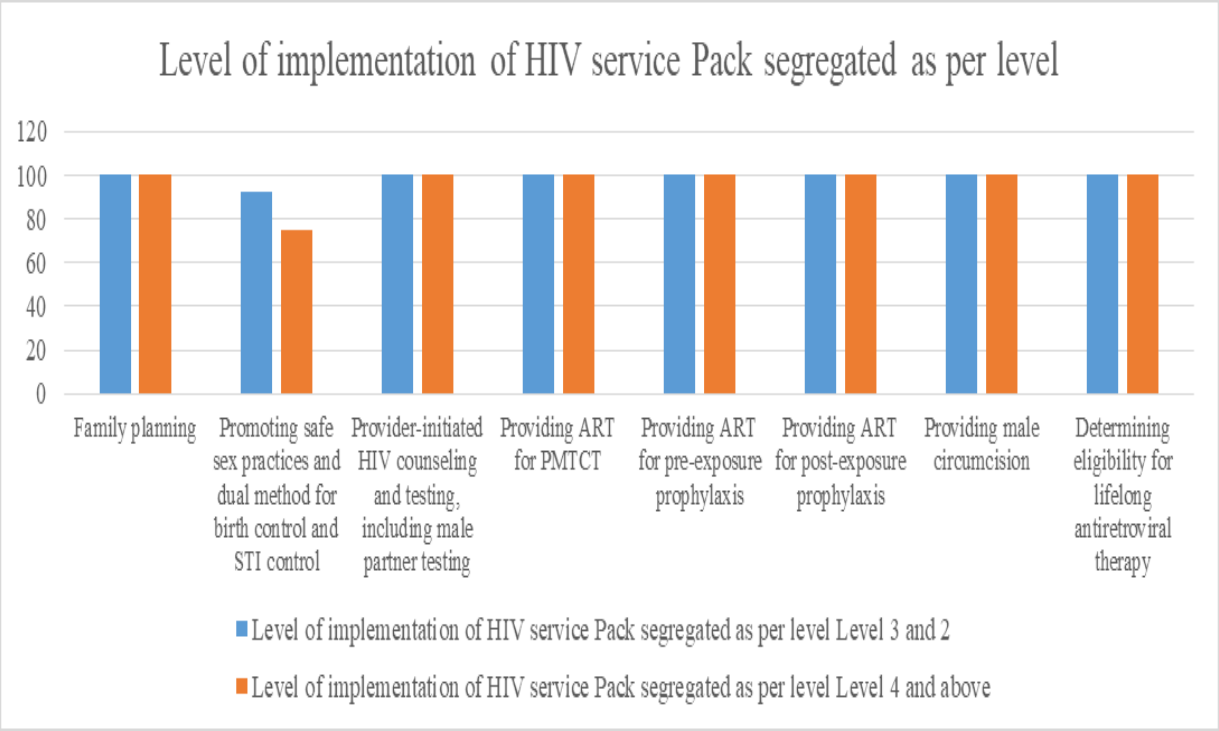

Figure 4.5. HIV management services

4.2.11 Management of fertility and sub-fertility

The fertility and sub-fertility package had 7 interventions. Three of the seven, namely, defusing stigmatization of infertility and assumption of fate, counseling on infertility and counseling for those diagnosed with unpreventable causes of infertility/sub-fertility were not observed at all the levels. Screening and diagnosis of couples following 6–12 months of attempting pregnancy and Management of underlying causes of infertility/sub-fertility,

including past STIs were implemented at both levels at 9% for both for Level 3 and below and 25% and 32% for level 4 and above, respectively (Figure 4.6).

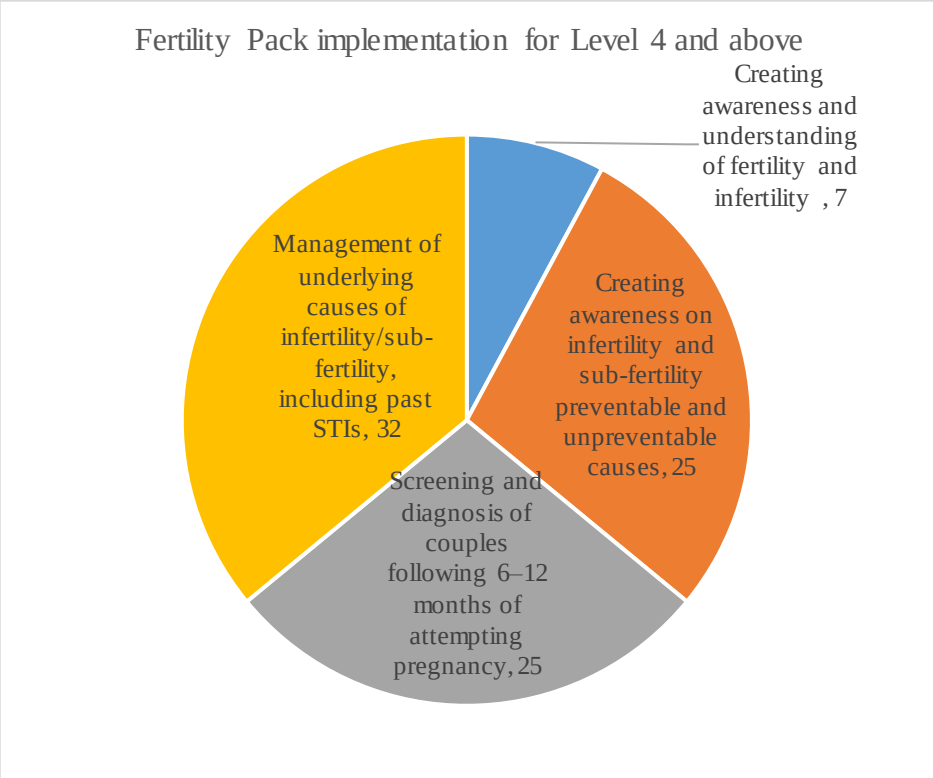

Figure 4.6. Fertility and subfertility management service pack

4.2.12 Prevention and management of female genital mutilation (FGM)

There were 5 aspects under FGM PCC service pack. These were: hosting public forums on discussing and discouraging the FGM, screening women and girls for FGM to detect complications, informing women and couples about complications of FGM and access to treatment, providing corrective surgery for women with complications of FGM and removing cysts and treating other complications of FGM. Only one out of the five,

providing corrective surgery for women with complications of FGM, was implemented at 7% in the Level 5 Hospital.

4.2.13 Mental health disorders management

Mental health intervention package had the following aspects; - providing general mental health education before pregnancy, providing psychosocial counseling before pregnancy, counseling and treating depression in women of childbearing age, strengthening community networks for women, promoting women's empowerment, improving access to education and or information for women of childbearing age and reducing economic insecurity of women of childbearing age. Only counseling and treating depression in women of childbearing age (13%) and strengthening community networks for women (57%) were implemented in the level four and five hospitals.

4.2.14 Psychoactive substance use prevention and management

Five out of the 9 interventions of the psychoactive substance use service pack were implemented in level 4 and 5 hospitals. These were: providing brief interventions and treatment when needed (38%), establishing prevention programs to reduce substance use in adolescents (7%), treating substance use disorders, including pharmacological (7%), providing psychological interventions for substance use (7%) and providing family planning assistance for families with substance use disorders (44%) and it was also implemented in the lower-level facilities at rate of 42%. The rest of the aspects of mental health: screening for substance use, changing individual and social norms regarding drinking, screening and

counseling of people who are problem drinkers and treating people who have alcohol use disorders were not observed to be implemented in all the facilities.

4.2.15 Intimate partner and sexual violence management

The intimate partner and sexual violence service pack had 7 interventions. Four of the 7 aspects were implemented in higher KEPH levels and 2 were implemented across all the levels. Those that were implemented were: health promotion to prevent intimate partner violence, and providing age-appropriate sexuality education that addresses human rights at 7% only in level 4 and 5 facilities, while recognizing signs of violence against women 9% and 25% and providing post-rape care, referral and psychosocial support to victims of violence 100% and 44% in level 3 and below and 4 and above respectively. The other were unimplemented, namely: providing age-appropriate sexuality education that addresses gender equality, providing age-appropriate sexuality education that addresses sexual relations and linking economic empowerment, gender equality and community mobilization activities.

4.2.16 General Counselling

The performance of this package of intervention is summarised in Table 4.7.

Table 4.7. Level of implementation of General Counseling service

General Counseling	Level 2 & 3	Level 4 & above
Counseling on recommended minimum of 4 ANC visits	67	100
Counseling on birth preparedness	67	100
Counseling about family planning	59	100
Counseling about HIV/AIDS	100	100
Counseling on use of ITNs to prevent malaria	17	100
Counseling about breastfeeding	17	100
Counseling about newborn care	0	100
Counseling on postnatal care visits	100	100
Implementation	**53**	**100**

4.2.17 Diagnosis and Managing of specific diseases

This service pack was being poorly implemented at the facilities in lower KEPH levels (2%). There was no provision of diagnosis and management of rubella at all levels. The other aspects of diagnosis and management were implemented in level 4 and above as represented in Figure 4.7.

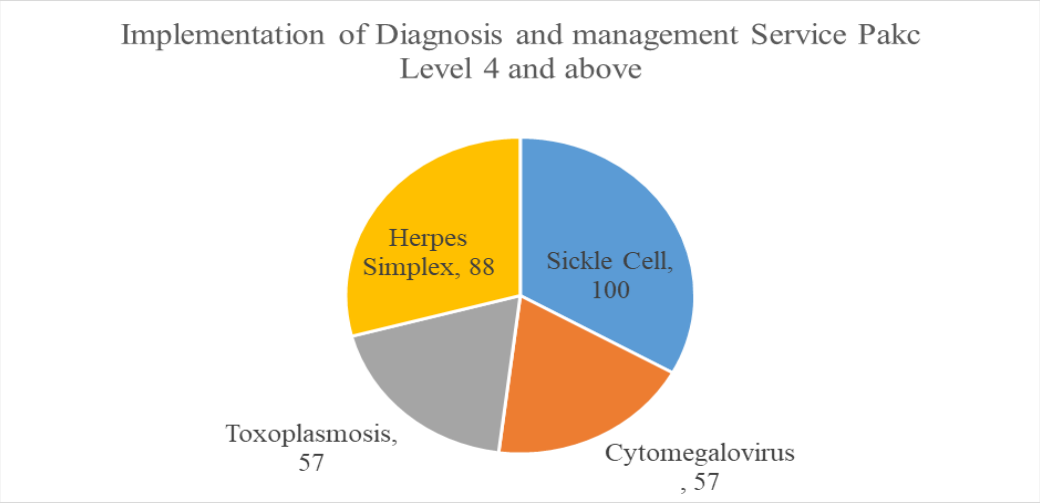

Figure 4.7 Diagnosis and management of specific diseases

4.3 Objective 2: The influence of the human capital on provision of pre-conception care

Human capital is the knowledge, skills and experiences owned and used by individuals. In this study it was conceptualized as; knowledge on preconception care for each cadre of service providers, perceptions on the importance of preconception care, their practice in implementation of this care and adequacy of training on preconception care. Using a health worker questionnaire, the study elicited the level of knowledge of the various health workers per cadre and level of training, their perception on their competence to provide care, adequacy of their training and their perceptions on importance of preconception care. Further, two focused group discussion were done to triangulate the findings from the questionnaire.

4.3.1 Knowledge

Those workers who were able to give 5 correct interventions in the preconception package were considered knowledgeable. From the study, at least 50% of the health workers were found knowledgeable on preconception care with the exception of lab technicians. The highest proportion of health workers found knowledgeable at 76.3 % (n=38) were Doctors (Table 4.8).

Table. 4.8. Health Provider PCC Knowledge desegregated per Facility Level

			Facility Level		
Cadre	**Knowledgeable on PCC**		Level 2 & 3	Level 4 & 5	**Total**
Nurse	Knowledgeable on PCC	Yes	37 (27)	100 (73)	137 (51.9)
		No	36 (28.3)	91 (71.7)	127 (48.1)
	Total		73 (27.7)	191 (72.3)	264 (100)
Doctor	Knowledgeable on PCC	Yes	1 (3.4)	28 (96.6)	29 (76.3)
		No	0 (0)	9 (100)	9 (23.7)
	Total		1 (2.6)	37 (97.4)	38 (100)
Clinical Officer	Knowledgeable on PCC	Yes	13 (28.3)	33 (71.7)	46 (62.2)
		No	6 (21.4)	22 (78.6)	28 (37.8)
	Total		19 (25.7)	55 (74.3)	74 (100)
Nutritionist	Knowledgeable on PCC	Yes	5 (17.9)	23 (82.1)	28 (59.6)
		No	3 (15.8)	16 (84.2)	19 (40.4)
	Total		8 (17)	39 (83)	47 (100)
Lab Tech	Knowledgeable on PCC	Yes	5 (22.7)	17 (77.3)	22 (45.8)
		No	6 (23.1)	20 (76.9)	26 (54.2)
	Total		11 (22.9)	37 (77.1)	48 (100)
Total	**Knowledgeable**	**Yes**	**61 (23.3)**	**201 (76.7)**	**262 (55.6)**
		No	**51 (24.4)**	**158 (75.6)**	**209 (44.4)**
	Total		**112 (23.8)**	**359 (76.2)**	**471 (100)**

The knowledge status varied across the various health provider characteristics. There was a significant difference in knowledge among the cadres (*P*=0.023) and the level of education (*P*=0.01) (Table 4.9).

Table 4.9. Health worker characteristics and knowledge status

Characteristics	Grouping	Knowledgeable		Total	P value
		Yes	No		
Age	30 and Below	106	125	231	0.612
	Above 30	105	136	241	
	Total	**211**	**261**	**472**	
Marital status	Married	143	180	325	0.749
	Not Married	67	80	147	
	Total	**210**	**260**	**472**	
Sex	Male	75	53	128	0.408
	Female	188	158	346	
	Total	**263**	**211**	**474**	
Cadre	Nurse	138	127	265	**0.023**
	Doctor	29	9	38	
	Clinical Officer	46	29	75	
	Nutrition	28	20	48	
	Lab Tech	22	27	49	
	Total	**263**	**212**	**475**	
Level of Education	Degree and above	104	60	164	**0.010**
	Diploma or Certificate	159	152	311	
	Total	**263**	**212**	**475**	
Experience2	Up to 5	138	101	239	0.267
	More than 5 Years	120	108	228	
	Total	**258**	**209**	**467**	
Facility Level	Level 2 & 3	61	51	112	0.618
	Level 4 & 5	200	158	358	
	Total	**261**	**209**	**470**	

The first FGD was composed of nurses and the second FGD was made up of community health volunteers. Upon inquiry on what preconception care is, the respondents were able to

capture the salient features of PCC. They managed to capture aspects of biomedical, behavioral and social determinants of pregnancy outcomes.

Further prompting on what are the interventions for preconception care, several themes were brought out which were very much similar to the recommended interventions. The themes included nutritional support, environmental risk exposure reduction, counselling, diagnosis and treatment of diseases as well as mental and physical health.

4.3.2 Perceived competence

A total of 81.6% of the doctor interviewed expressed confidence in their ability to provide comprehensive PCC while only 29.9% and 20.8% of the nurses and lab technicians felt competent respectively (Table 4.10).

Table 4.10. Perceived competence in provision of PCC

			Facility Level		
Cadre	**Competence**		Level 2 and 3 n (%)	Level 4 and 5 n (%)	**Total n (%)**
Nurse	Competent	Yes	11 (26.6)	29 (73.4)	40 (29.9)
		No	26 (28.1)	68 (71.9)	94 (70.1)
	Total		37 (27.7)	97 (72.3)	134 (100)
Doctor	Competent	Yes	1 (3.2)	30 (96.8)	31 (81.6)
		No	0 (0)	7 (100)	7 (18.4)
	Total		1 (2.6)	37 (97.3)	38 (100)
Clinical Officer	Competent	Yes	5 (20.8)	19 (79.2)	24 (32.4)
		No	14 (*28)	36 (72)	50 (67.6)
	Total		19 (25.7)	55 (74.3)	74 (100)
Nutritionist	Competent	Yes	1 (6.7)	14 (93.3)	15 (31.9)
		No	7 (21.9)	25 (78.1)	32 (68.1)
	Total		8 (17)	39 (83)	47 (100)
Lab Tech	Competent	Yes	5 (50)	5 (50)	10 (20.8)
		No	6 (15.8)	32 (84.2)	38 (79.2)
	Total		11 (22.9)	37 (77.1)	48 (100)
Total	**Competent**	**Yes**	**17 (20.8)**	**64 (79.2)**	**159 (33.8)**
		No	**79 (25.3)**	**233 (74.7)**	**312 (66.2)**
	Total		**112 (23.8)**	**359 (76.2)**	**471 (100)**

4.3.3 Perceptions on preconception care

On perceptions, 86.4% (n=472) of the staff appreciate that preconception care is as important as the other health packages like ANC in the continuum of maternal health care. They also belief a hospital setting is adequate to provide the care (67.4%, n=472) and feel that PCC is should be a priority in their daily workload (49.5%, n=472). Many note that there is inadequate time to provide PCC (41%, n=472) while a good number (22%, n=472) are unsure (Table 4.11).

Table 4.11. Staff Perceptions on PCC and provision

Perceptions	Grouping	Nurses	Non-Nurses	Total
Preconception care is as important as ANC	Strongly Disagree	27 (54)	23 (46)	**50 (10.6)**
	Disagree	2 (40)	3 (60)	**5 (1.1)**
	Neither Agree nor Disagree	5 (55.6)	4 (44.4)	**9 (1.9)**
	Agree	65 (58.6)	46 (41.4)	**111 (23.5)**
	Strongly Agree	165 (55.6)	132 (44.4)	**297 (62.9)**
Total		**264 (55.9)**	**208 (44.1)**	**472 (100)**
A hospital setting is the best place to provide preconception care	Strongly Disagree	29 (56.9)	22 (43.1)	**51 (10.8)**
	Disagree	28 (50.9)	27 (49.1)	**55 (11.7)**
	Neither Agree nor Disagree	26 (54.2)	22 (45.8)	**48 (10.2)**
	Agree	74 (55.2)	60 (44.8)	**134 (28.4)**
	Strongly Agree	107 (58.2)	77 (41.8)	**184 (39.0)**
Total		**264 (55.9)**	**208 (44.1)**	**472 (100)**
Preconception care is a high priority in my workload	Strongly Disagree	17 (53.1)	15 (46.9)	32 (6.9)
	Disagree	45 (53.6)	39 (46.4)	84 (18.1)
	Neither Agree nor Disagree	74 (61.2)	47 (38.8)	121 (26)
	Agree	62 (53)	55 (47)	117 (25.2)
	Strongly Agree	62 (55.9)	49 (44.1)	111 (23.9)
Total		**260 (55.9)**	**205 (44.1)**	**465 (100)**
There is not enough time to provide a preconception clinic	Strongly Disagree	47 (53.4)	41 (46.6)	**88 (18.6)**
	Disagree	51 (58)	37 (42)	**88 (18.6)**
	Neither Agree nor Disagree	56 (55.4)	45 (44.6)	**101 (21.4)**
	Agree	53 (58.9)	37 (41.4)	**90 (19.1)**
	Strongly Agree	57 (54.3)	48 (45.7)	**105 (22.2)**
Total		**264 (55.9)**	**208 (44.1)**	**472 (100)**
I do not have the appropriate skills to offer preconception care	Strongly Disagree	81 (55.9)	64 (44.1)	**145 (30.9)**
	Disagree	52 (55.3)	42 (44.7)	**94 (20)**
	Neither Agree nor Disagree	35 (62.5)	21 (37.5)	**56 (11.9)**
	Agree	31 (52.5)	28 (47.5)	**59 (12.6)**
	Strongly Agree	64 (55.2)	52 (44.8)	**116 (24.7)**
Total		**263 (56)**	**207 (44)**	**470 (100)**

Consequently, these perceptions were found to have a significant association with provision of preconception care. There was a significant difference in the means for those who felt PCC was important (*P*=0.003), was a priority (*P*= 0.048) and the hospital setting was the best place to offer it (*P*=0.007) (Table 4.12). Though the was no significant difference in the means of those who felt that there was no time for PCC, it was brought up as a challenge by the FGD where the discussants identified inadequate time as a challenge to provision of this care.

Table 4.12. Perceptions and PCC

Characteristic	Grouping	N	M	SD	SEM	t	Df	P
Preconception care is as important as ANC	Strongly Agree	297	70.51	8.409	.488	2.96	345	**.003**
	Strongly Disagree	50	74.34	8.775	1.241			
A hospital setting is the best place to provide preconception care	Strongly Agree	184	68.01	8.496	.626	2.01	73.40	**.048**
	Strongly Disagree	51	70.98	9.547	1.337			
PCC is a high priority in my workload	Strongly Agree	111	68.49	8.695	.825	2.75	141	**.007**
	Strongly Disagree	32	73.38	9.435	1.668			
No enough time to provide PCC	Strongly Agree	105	71.98	8.878	.866	-1.41	191	.159
	Strongly Disagree	88	70.15	9.100	.970			
I do not have the appropriate skills to offer preconception care	Strongly Agree	116	73.75	8.236	.765	-2.35	259	**.020**
	Strongly Disagree	145	71.13	9.503	.789			

Statistical significance determined by student t test at P≤0.05.

The discussants in the FGDs felt that preconception care was an important component of the continuum of maternal care. From the discussions the themes that highlighted benefits of PCC were found to be; psychological preparation of the mother, early diagnosis and treatment of pregnancy endangering conditions, opportunity to give health education

including on family. They also saw PCC as an opportunity to start building trust between the health providers and clients.

4.3.4 Perceptions on adequacy of training

While all staff indicate that they have never had any formal updates on preconception care, they had varied views about the adequacy of the training received at their training institutions. Most doctors, 65.6% (n=38), felt their training was adequate to prepare them to give care while only 29, 2% of the laboratory technicians had similar sentiments, Table 4.13.

Table 4.13. Perceived Adequacy of training on PCC

			Facility Level		
Cadre	**Have adequate training on PCC**		Level 2 and 3	Level 4 and 5	**Total**
Nurse	Adequate Training on PCC	Yes	27 (21.6)	98 (78.4)	125 (47.4)
		No	46 (33.1)	93 (66.9)	139 (52.6)
	Total		73 (27.7)	191 (72.3)	264 (100)
Doctor	Adequate Training on PCC	Yes	0 (0)	25 (100)	25 (65.8)
		No	1 (7.7)	12 (92.3)	13 (34.2)
	Total		1 (2.6)	37 (97.4)	38 (100)
Clinical Officer	Adequate Training on PCC	Yes	11 (27.5)	29 (72.5)	40 (54.1)
		No	8 (23.5)	26 (76.5)	34 (45.9)
	Total		19 (25.7)	55 (74.3)	74 (100)
Nutritionist	Adequate Training on PCC	Yes	0 (0)	15 (100)	15 (31.9)
		No	8 (25)	24 (75)	32 (68.1)
	Total		8 (17)	39 (83)	47 (100)
Lab Tech	Adequate Training on PCC	Yes	4 (28.6)	10 (71.4)	14 (29.2)
		No	7 (20.6)	27 (79.4)	34 (70.8)
	Total		11 (22.9)	37 (77.1)	48 (100)
Total	Adequate Training on PCC	Yes	42 (19.2)	177 (80.8)	219 **(46.5)**
		No	70 (27.8)	182 (72.2)	252 **(53.5)**
	Total		112 (23.8)	359 (76.2)	471 (100)

Data is in numbers. Figures in bold show the average proportions of providers on whether their training was adequate to enable them to provide PCC.

Further the respondents were required to indicate whether they have ever learnt about specific services in the PCC package and their responses documented (Table 4.14). 40.3%

(n=471) of health providers indicate they were trained on the risks associated with tobacco use and how to discourage it while only 1.1% (n=471) felt they were adequately prepared to manage and prevent sexually transmitted infections as part of PCC.

Table 4.14. Adequacy of preservice training on specific interventions

Training areas	NO	YES
	N (%)	N (%)
Nutritional deficiencies & disorders of preconception relevance	22 (4.7%)	442 (95.3%)
Vaccine-preventable infections of Preconception relevance	189 (40.8%)	274 (59.2%)
Tobacco use and its relevance in preconception care	190 (40.3%)	281 (59.7%)
Environmental risks in preconception	159 (34.3%)	304 (65.7%)
Genetic disorders of preconception relevance	145 (31.2%)	320 (68.8%)
Relevance of planning for pregnancy	11 (2.3%)	459 (97.7%)
Sexually transmitted infections	5 (1.1%)	466 (98.9%)
HIV	11 (2.3%)	464 (97.7%)
Infertility and sub-fertility diagnosis and management	56 (11.8%)	419 (88.2%)
Female genital mutilation diagnosis and management	159 (33.5%)	316 (66.5%)
Mental health disorders of preconception relevance	90 (19.3%)	376 (80.7%)
Psychoactive substance use and effects on pregnancy	78 (16.8%)	386 (83.2%)
Intimate partner and Sexual violence	94 (19.9%)	378 (80.1%)
General Counseling on safe motherhood	18 (3.8%)	454 (96.2%)
Diagnosing& Managing diseases that can cause congenital problems	44 (9.4%)	426 90.6%

The outcomes deduce that the health providers were exposed to most of the concepts on PCC during their preservice training although a good number indicated having not learnt about vaccine-preventable infections of preconception relevance 189 (40.8%), tobacco use

and its relevance in preconception care 190 (40.3%) and female genital mutilation diagnosis and management 159 (33.5%).

4.3.5 Human capital characteristics and PCC provision

An independent-samples t-test was conducted to compare the provision of PCC and various characteristics of the health care providers. There was a significant difference in the means of reported provision of PCC between the cadres for nurses (M=70.04, SD=8.951) and other providers (M=71.90, SD=8.732); t (473) =-2.23, *P*=0.026, years of experience up to 5 years (M=72.04, SD=8.417) and more than 5 years (M=69.89, SD=9.283); t (465) =2.63, *P*=0.009 (Table 4.15).

Table 4.15. Human capital characteristics and PCC provision

Characteristic	Grouping	N	M	SD	SEM	t	df	P
Age	30 and Below	231	71.51	8.721	.574	1.45	470	.148
	Above 30	241	70.32	9.053	.583			
Sex	Male	128	70.40	9.670	.855	-0.63	205.59	.531
	Female	346	71.01	8.594	.462			
M/status	Married	325	70.98	9.055	.502	0.56	470	.579
	Not Married	147	70.49	8.556	.706			
Level of Education	Degree and above	164	71.79	8.687	.678	1.64	473	.101
	Diploma or Certificate	311	70.38	8.977	.509			
Cadre	Nurses	265	70.04	8.951	.550	-2.28	473	**.023**
	Non Nurses	210	71.90	8.732	.603			
Experience (Years)	Up to 5	239	72.04	8.417	.544	2.63	465	**.009**
	More than 5	228	69.89	9.283	.615			
Adequate PCC training	Yes	222	71.50	8.924	.599	1.46	473	.145
	No	253	70.31	8.847	.556			
Knowledgeable on PCC	Yes	263	71.08	8.654	.534	0.60	473	.552
	No	212	70.59	9.196	.632			
Competent	Yes	160	71.30	9.111	.720	0.76	473	.448
	No	315	70.64	8.788	.495			

Statistical significance determined by the t test at P≤0.05.

Although the t-test did not show a significant difference in the mean of provision as per knowledge status, the lack of it was cited to be a challenge in provision of PCC during the FGD. As was the case for cadre of health workers affecting provision of PCC.

4.4 Objective 3: To examine influence of structural capital on provision of preconception care in health facilities in Kisumu County

The third objective of the study was to determine the structural capital set in place for provision and use of PCC in Kisumu county health facilities. In this case structural capital was the institutional knowledge, information, procedures, and the organizational culture of these health facilities in provision of preconception care. A checklist was used to document whether each of the services in the PCC package were offered in the facilities, whether there were protocols for these services, whether these services were budgeted for and included in the health information systems and finally whether they were included in the service delivery charter.

4.4.1 Structural capital investment rate

The overall investment in structural capital for PCC was 38.5% in the county. The median for inclusion in the health information systems (HMIS) was highest at 51%. The summary of the overall rate of investment per aspect was as Table 4.16.

Table 4.16. Structural capital investment rate

		PCC SERVICE CHARTER	PCC PROTOCOL	PCC IN HMIS	PCC BUDGETED
n	Valid	28	28	28	28
	Missing	0	0	0	0
Median		32.00	33.00	51.00	29.00
Mode		17	30	35	27
Minimum		15	28	34	26
Maximum		55	51	70	49

The figures are proportions of facilities which had the specific aspects of structural.

Inclusion of PCC service in the HMIS was the highest scoring aspect of structural capital at 36% (n=28) while the least was inclusion of PCC in the service charter for primary level facilities. Meanwhile, HIV prevention and management had the highest implementation in aspects of structural capital at 91%. Interestingly there were service packs whose structural capital did not exist at all. These services were female genital mutilation prevention and management, environmental risk exposure reduction and infertility and subfertility management. These are further described in Table 4.17.

Table 4.17. Structural capital implementation for primary health facilities

SERVICE AREA	SERVICE CHARTER	PROTOCOL	HMIS	BUDGET	AVE
Nutritional Management	33	78	67	44	**56**
Vaccination	0	100	100	100	**75**
Tobacco Use Prevention	0	20	20	0	**10**
Environmental Risk Exposure Reduction	0	0	0	0	**0**
Genetic Disorder Management	20	20	40	20	**25**
Planned Pregnancies	11	44	33	33	**30**
Sexually Transmitted Diseases Management	43	43	86	100	**68**
HIV Prevention and Management	75	88	100	100	**91**
Infertility and Subfertility management	0	0	0	0	**0**
Female Genital Cut Prevention and Management	0	0	0	0	**0**
Mental Health Disorders Management	0	0	14	0	**4**
Psychoactive Substance Use Prevention and Management	11	0	11	0	**6**
Intimate Partner and Sexual Violence Management	0	14	29	0	**11**
General Counselling	25	75	25	63	**47**
Diagnosing and Managing	0	20	20	0	**10**
Level 2&3	**17**	**34**	**36**	**31**	**30**

The figures in bold are column and row averages for each of the services and each structural capital aspect respectively.

Further, the structural capital investment in referral facilities was higher than the former. The highest scoring aspects were inclusion in the service charter which is a major difference with the primary facilities. The least investment was seen in budgeting at 29% with an average of 47% (Table 4.18).

Table 4.18. Structural Capital Implementation Desegregated for Level 4 and 5

SERVICE AREA	SERVICE CHARTER	PROTOCOL	HMIS	BUDGET	AVE
Nutritional Management	78	78	78	78	**78**
Vaccination	67	100	100	100	**92**
Tobacco Use Prevention	0	0	0	0	**0**
Environmental Risk Exposure Reduction	0	0	0	0	**0**
Genetic Disorder Management	20	20	40	20	**25**
Planned Pregnancies	89	33	22	22	**42**
Sexually Transmitted Diseases Management	100	86	86	86	**90**
HIV Prevention and Management	88	100	100	100	**97**
Infertility and Subfertility management	0	0	14	0	**4**
Female Genital Cut Prevention and Management	20	0	0	0	**5**
Mental Health Disorders Management	14	29	71	0	**29**
Psychoactive Substance Use Prevention and Management	89	89	0	0	**45**
Intimate Partner and Sexual Violence Management	0	0	100	0	**25**
General Counselling	100	100	100	0	**75**
Diagnosing and Managing	80	80	80	40	**70**
Level 4 and above	**54**	**50**	**53**	**29**	**47**

Data is in proportions.

4.4.2 Structural capital and PCC provision rate

A T test was done to determine whether there was a significant difference in the mean PCC provision for the various aspects of structural capital. The results revealed that that was a significant difference in the provision 0f PCC for inclusion of PCC aspects in HMIS reporting system (M=59.00, SD=4.134); t (26) =-6.12, $P<0.0001$, the KEPH level

(M=60.21, SD=4.902); t (26) = -5.06, *P*<0.0001 and whether a facility offered inpatient and outpatient services (M=69.36, SD=4.924); t (26) =4.63, *P*<0.0001 had a significant association with PCC provision (Table 4.19).

Table 4.19. Structural Capital Characteristics and PCC Provision

Characteristic	Grouping	N	M	SD	SEM	T	Df	P
KEPH Level	3 and Below	14	60.21	4.902	1.310	-5.06	26	**<.0001**
	4 and Above	14	69.57	4.879	1.304			
Setting	Urban	10	67.70	7.959	2.517	1.69	26	.102
	Rural	18	63.33	5.646	1.331			
Service	Out &Inpatient	14	69.36	4.924	1.316	4.63	26	**<.0001**
	Out Patient	14	60.43	5.273	1.409			
PCC Protocol	<30*	3	60.67	5.859	3.383	-1.15	26	.260
	=/>30	25	65.40	6.788	1.358			
Budgeted	<30*	15	65.33	6.705	1.731	.36	26	.719
	=/>30	13	64.38	7.066	1.960			
PCC Included n HMIS	<50*	12	59.00	4.134	1.193	-6.12	26	**<.0001**
	=/>50	16	69.31	4.600	1.150			
Budgeted	<30*	15	65.33	6.705	1.731	.36	26	.719
	=/>30	13	64.38	7.066	1.960			
Service Charter	<30*	13	60.62	7.042	1.953	-3.82	26	**.0001**
	≥30	15	68.60	3.738	.965			

*Statistical significance determined by the t-test. *thresholds used for stratification were medians of service provision.*

4.4.3 Structural capital and PCC implementation

A Pearson's correlation was done to determine reliability of the variables to measure the relationship between PCC implementation and structural capital. The dependent variable

was PCC being Provided (N=28, M=65, SD 6.76) while the independent variables included in the model were, PCC is in Service Charter (N=28, M=33, SD 15.79), PCC Protocols Available (N=28, M=38, SD 8.89), PCC in HMIS Reporting (N=28, M=46, SD 9.71) and PCC is Budgeted for (N=28, M=32, SD 6.47) (Table 4.20).

Table 4.20. Variables Pearson Correlation Analysis

Pearson Correlation R^2(P Value)	PCC Provided	PCC is in Service Charter	PCC Protocols Available	PCC in HMIS Reporting	PCC is Budgeted for
PCC Provided	1	0.57(0.0001)	0.66(<0.0001)	0.86(<0.0001)	0.28(0.077)
PCC is in Service Charter	0.56(<0.0001)	1	0.89(<0.0001)	0.74(<0.0001)	-0.10(0.31)
PCC Protocols Available	0.67(<0.0001)	0.89(<0.0001)	1	0.80(<0.0001)	-0.12(0.277)
PCC in HMIS Reporting	0.86(<0.0001)	0.74(<0.0001)	0.80(<0.0001)	1	0.40(0.017)
PCC is Budgeted for	0.28(0.077)	-0.10(0.31)	-0.12(0.277)	0.40(0.017)	1

All the variables except PCC being budgeted for had strong significant positive correlation with each other.

4.4.4 Structural capital as a determinant of PCC provision

A multiple regression model was developed using stepwise criteria where probability of F to enter was ≤0.05 to assess the ability of structural capital (PCC is in Service Charter, PCC Protocols Available, PCC in HMIS Reporting and PCC is Budgeted for) to influence provision of PCC. Preliminary analyses were performed to ensure there is no violation of assumption of normality and linearity. The distribution of the variables was normal and demonstrated homoscedasticity in scatter plots for standardized residuals and predictors. A

significant regression model was found F (1,26) =74.68, *P*<0.0001, R^2 0.74, which means the predictor variable in the model was able to predict 74% of the variance in dependent variable.

Therefore, this multiple regression, performed to predict PCC service provision based on structural capital (PCC is in Service Charter, PCC Protocols Available, PCC in HMIS Reporting and PCC is Budgeted for), only found PCC inclusion in HMIS reporting as the significant predictor (b= 0.6, t (26) =8.64, *P*<0.0001, 95% CI 0.46-0.74) of the outcome (Provision) (Table 4.21).

Table 4.21. Multiple linear regression of Structural capital on PCC Services Provision

Predictor Variable	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.	95.0% Confidence Interval for B
(Constant)	37.304	3.260		11.442	<0.0001	30.60-44.01
PCC in HMIS Reporting	.600	.069	.861	8.642	<0.0001	.46-.74

a. Dependent Variable: PCC Provided

b. Predictors in the Model: (Constant), PCC in HMIS Reporting

The other 3 variables (service charter, protocols, budgeted for) were removed from the equation after adjustment in stepwise model.

This finding was also corroborated in the transcript from the FGD stressing the importance of having PCC in the HMIS reporting tools to encourage its provision. This applied to the protocols and guidelines as well.

4.5 Objective 4: The effect of relational capital on provision of PCC

4.5.1 Relational capital investment

Relational capital was measured by considering the availability of linkages up and down, partnerships, client's satisfaction with services received and readiness to seek care. Data on linkages and partnerships was derived from the checklists and presented in Table 4.22.

Table 4.22. Proportions of facilities with aspects of relational capital

SERVICE AREA	LINKAGE UP	LINKAGE DOWN	PARTNERSHIP	AVERAGE
Nutritional Management	67	11	11	**30**
Vaccination	33	0	100	**44**
Tobacco Use Prevention	0	80	60	**47**
Environmental Risk Exposure Reduction	0	67	0	**22**
Genetic Disorder Management	100	0	20	**40**
Planned Pregnancies	22	67	100	**63**
Sexually Transmitted Diseases Management	43	57	86	**62**
HIV Prevention and Management	50	13	100	**54**
Infertility and Subfertility management	57	43	0	**33**
Female Genital Cut Prevention and Management	60	40	20	**40**
Mental Health Disorders Management	14	71	0	**28**
Psychoactive Substance Use Prevention and Management	56	44	0	**33**
Intimate Partner and Sexual Violence Management	14	86	14	**38**
General Counselling	0	50	88	**46**
Diagnosing and Managing	80	0	0	**27**
Level 2&3	**39**	**44**	**40**	**41**

Figures in bold in the columns are means of structural capital for each service and those on the rows are means of each structural capital aspect for all the intervention packages.

4.5.2 Relational capital and provision of PCC

As much as linkage of services downwards for level 4 and above was high, there was no congruent linkage upwards for the same services. Further, the mean provision for the facilities that had linkages up and down as well as inclusion of the services in the citizens service charter were significantly different, Table 4.23.

Table 4.23. Relational Capital Characteristics and PCC Provision

Characteristic	Grouping	N	M	SD	SEM	T	Df	P
Linkage Up	<35	9	70.44	5.725	1.908	3.59	26	**.001**
	=/>35	19	62.26	5.596	1.284			
Linkage Down	<50	14	61.07	7.130	1.906	-3.59	19.11	**.002**
	=/>50	14	68.71	3.561	.952			
Service Charter	<30	13	60.62	7.042	1.953	-3.82	26	**.001**
	=/>30	15	68.60	3.738	.965			
Partnership	<40	14	63.86	6.503	1.738	-0.81	26	.428
	=/>40	14	65.93	7.098	1.897			

Statistical significance determined by t test at P≤0.05. The threshold for stratification/grouping was the median.

A Pearson's correlation was done to determine whether there was a relationship between PCC provision and relational capital aspects. The dependent variable was PCC being

provided (N=28, M=65, SD 6.76) while the independent variables included in the model were, PCC Linked upwards (N=28, M=37.14, SD 5.82), PCC linked downwards (N=28, M=48.89, SD 8.32), Partnership for PCC (N=28, M=39, SD 11.34).

Table 4.24. Variables Pearson Correlation Analysis.

Pearson Correlation R^2(P Value)	**PCC Provided**	**Linkage for PCC Upwards**	**Linkage for PCC Downwards**	**There is PCC Partnerships**
PCC Provided	1	-0.81(<0.001)	0.43(0.011)	0.14(0.238)
Linkage for PCC Upwards	-0.81(<0.0001)	1	-0.69(<0.0001)	0.09(0.324)
Linkage for PCC Down	0.43(0.011)	-0.69(<0.0001)	1	-0.55(0.001)
There is PCC Partnerships	0.14 (0.238)	0.09(0.324)	-0.55(0.001)	1

The figures are the Pearson correlation R2 and those in brackets are P values

All the variables except PCC Linkage upwards had weak positive correlation with PCC service provision. There was no significant relationship between PCC partnership and PCC provision. Equally, there was a positive correlation between PCC partnership and Linkage upwards albeit weak. Generally, the correlation between the predictor variables and outcome variables was weak, negative or not significant.

4.5.3 Relational capital as a determinant of PCC provision

A multiple regression model was developed using stepwise criteria where probability of F to enter was ≥0.050 and probability to remove was ≥0.100 and performed to assess the ability of relational capital (PCC Linked upwards, PCC linked downwards and Partnership for PCC). Preliminary analyses were performed to ensure there is no violation of assumption of normality and linearity. The distribution of the variables was normal and demonstrated homoscedasticity in scatter plots for standardized residuals and predictors. A significant

regression model was found F (1,26) =50.40 P<0.0001, R^2 0.66, which means the predictor variable in the model was able to predict 66% of the variance in dependent variable.

Therefore, this multiple regression, performed to predict PCC service provision based on relational capital, only found Linkage for PCC Upwards as the significant predictor (b= -0.94, t (26) =-7, P<0.0001, 95% CI -0.55- -0.67) of the outcome (Provision). The other variables were removed from the equation after adjustment.

Table 4.25. Multiple linear regression of Relational capital on PCC Services Provision

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for
Predictor Variable	B	Std. Error	Beta	T	Sig.	B
(Constant)	99.968[b]	4.998		20.000	<0.0001	89.69-110.24
Linkage for PCC Upwards	-.944	.133	-.812	-7.100	<0.0001	-0.55- -0.67

a. Dependent Variable: PCC Provided

b. Predictors in the Model: (Constant), Linkage for PCC Upwards.

4.5.4 Clients satisfaction with current services and readiness to receive PCC

Finally, in the 4th objective the study sought to examine the availability of linkages between the facilities and other entities that could promote demand and uptake of PCC. It specifically looked at the client's satisfaction on services received at the hospital, which make up preconception care package and their readiness to use PCC services incase offered.

The study demonstrated that more than half the clients interviewed were satisfied with the services they received. Furthermore, those who lived further away from facilities (OR=0.49,

P<0.0001), those who visited facilities which were found in rural areas (OR=0.47, *P*=0.01) and those facilities providing only outpatient services (OR=2.15, *P*=0.01) were significantly satisfied at *P*≤0.05 (Table 4.26).

Table 4.26. Client determinants of satisfaction

Characteristic	Grouping	Satisfaction with PCC		OR	95% CI	P Value
		Satisfied	Not Satisfied			
Facility level2	Level 3 and Below	36 (53)	32 (47)	1.1	0.74-1.62	0.641
	Level 4 and Above	109 (50.7)	106 (49.3)			
Location of Facility	Urban	127 (49.6)	129 (50.4)	0.47	0.26-0.84	**0.01**
	Rural	19 (67.9)	9(32.1)			
Services	Out Patient Only	19(67.9)	9 (32.1)	2.15	1.19-3.86	**0.01**
	Out/In Patient	127 (49.6)	129 (50.4)			
Service delivery Area	MCH	118 (49.7)	119 (50.3)	0.65	0.42-1.03	0.063
	Maternity	28 (60.2)	19 (39.8)			
How long to Facility2	Up to 30 min	104 (47.5)	115 (52.5)	0.49	0.33-0.74	**<0.0001**
	More than 30 Min	42 (64.8)	23 (35.2)			
How Much to facility 2	Up to 50	117 (50.9)	113 (49.1)	0.89	0.58-1.36	0.592
	More than 50	29 (53.8)	25(46.2)			

Statistical significance was determined by the chi-square at P≤ 0.05.

On readiness to seek care, clients with various characteristics significantly showed readiness to seek PCC services as depicted in Table 4.27. Those who were older than 25 years of age (OR=0.48, P<.0001), reside in rural areas (OR=1.641, *P*=0.014), had a higher level of education (OR=2.42, P<.0001), had had previous pregnancies (OR=2.45, *P*=0.003), were married (OR=1.71, *P*=0.045) and have ever heard of preconception care (OR=5.58, *P*<0.0001) were likely to express their intention to accept care if offered (Table 4.27).

Table 4.27. Client related determinants of readiness to use the services

Characteristic	Grouping	Readiness to use50% PCC		OR	95% CI	P Value
		Yes	No			
Age Group	25 and Below	27 (17.2)	132 (82.8)	0.48	0.32-0.72	**<.0001**
	Above 25	38 (30.1)	87 (69.9)			
Occupation	Employed	32 (26)	91 (74)	1.37	0.92-2.04	.118
	Unemployed	33 (20.4)	128 (79.6)			
Average Monthly Income (KSh)	Above 5000	38 (26)	110(74)	0.86	0.47-1.61	.644
	5000 and Below	39 (28.9)	97(71.1)			
Residence	Rural	33 (28)	85 (72)	1.64	1.10-2.43	**.014**
	Urban	32 (19.2)	134 (80.8)			
Education	Secondary and Tertiary	54 (27.3)	141 (72.7)	2.42	1.48-3.97	**<.0001**
	Primary	13 (13.5)	76 (86.5)			
Marital Status	Married	56 (24.9)	167 (75.1)	1.71	1.01-2.89	**.045**
	Not Married	12 (16.3)	54 (83.7)			
Previous pregnancies	1 or more	58 (27)	157(73)	2.45	1.34-4.48	**.003**
	None	7 (13.1)	47 (86.9)			
Ever heard of Preconception care	Yes	62 (29)	152 (71)	5.58	2.74-11.35	**<.0001**
	No	5 (6.8)	65 (93.2)			

Statistical significance determined by the chi square.

During the FGD, the discussants were asked to give the challenges they face in provision of PCC. One of them was low demand for the service because most clients seek care after they are pregnant and this could be related to lack of awareness. Other social factors were also shown to influence PCC provision in the FGDs especially non-disclosure of intention to get pregnant because it is thought to be a bad omen. When asked whether they found it easy to

provide preconception care, there were varied responses. But there was a clear indication that there was low demand for the service because most clients seek care after they are pregnant and this could be related to lack of awareness. Some discussants felt they lacked enough knowledge to enable them to provide this care. One felt that they were constrained by lack of resources. This is further elaborated by the comments here with. Some thought it was time wasting as they were already strained with other work.

4.6 Intellectual capital as a determinant of PCC provision

Linear regression analysis model was applied to adjust for confounders in the original t test and multilinear logistic regression, significant determinants of PCC services provision. The model applied allows entry of method and cases to be excluded list-wise. ANOVA was used for determining model significance. Significant regression model was found for all the three PCC capital regressed. The model statistics were as follows, F (2,464) =5.97, *P*=.003, R^2=.03, F (3, 24) =7.12, *P*<.0001, R^2=.41, F (3,24) =11.86, *P*<.0001 R^2= .55 for human, relational and structural capital regression models respectively. The Table below represent the outputs from the models for each capital. Only cadre b=0.01, t (464) =2.23, *P*=.026, years of experience b=-0.13, t (464) =-2.79, *P*=.005 and inclusion of PCC aspects in HMIS reporting system b=0.66, t (464) =2.23, *P*=.036 were significant determinants of PCC provision (Table 4.28).

Table 4.28. Regression Analysis of the significant Determinants of PCC Provision

Capital	Grouping	B	Df	T	P
Human Capital	Nurse vs Non-Nurses	0.10	464	2.23	**.026**
	Experience2	-0.13	464	-2.79	**.005**
Relational Capital	PCC Linkage Up	-0.34	24	-1.95	.064
	PCC Linkage Down	0.13	24	0.53	.598
	PCC Service Charter	0.33	24	1.34	.192
Structural Capital	Level	0.18	24	0.62	.543
	Service	0.05	24	0.17	.866
	PCC in Reported in HMIS	0.66	24	2.23	**.036**

P-values in bold were found significant.

When the focused group discussants were asked, "What do you need to be done or provided to help you be able to provide this care well"? There were several suggestions including on job trainings, creating public awareness for the service, hiring community health workers to create demand for the service, availing commodities specific to preconception care, provision of guides to use during provision of services. This emphasizes that development of intellectual capital for preconception care was considered a solution for improving delivery of preconception care services.

Other themes identified as important to improve care were; staffing especially laboratory to provide screening service, health system support from the government inform of prioritising, training available staff on PCC, including PCC services in the ongoing community outreach programs and availability of PCC commodities as well as Information education and communication (IEC) materials. All of which are components of intellectual capital.

4.7 Focused group discussion findings

What is PCC?

Upon inquiry on what preconception care is, the respondents were able to capture the salient features of PCC. They managed to capture aspects of biomedical, behavioral and social determinants of pregnancy outcomes

Themes	Quotes/features	FGD Number
Biomedical	*"…it includes the management of maternal conditions that could endanger her pregnancy…the care has to be before the mother gets pregnant…"* *"These are interventions that are taken before pregnancy in order to improve pregnancy outcome"*	FGD 1
	"....it has services like provision of nutritional supplements like folic to the mother to ensure proper development of the child"	FGD 2
Behavioural	*"… the care …before getting pregnant to ensure … the right health behaviors … right decisions that can positively impact on the child that she intends to carry…"*	FGD 1
	"…the couple … are advised on making healthy decisions like not smoking or drinking, eating healthy, and even having safe sex to reduce chances of STIs and HIV that can impact the pregnancy…yaani kuamua kufanyia mtoto haki hata kabla ya mimba (to decide to do what is right for the baby even before conceiving)"	FGD 2
Social	*"…mimba ni safari (pregnancy is a journey) … it begins the moment a couple make the decision to have a child … preconception care, to kiang'o (or whatever), should involve all those who matter, health care provider for the couple, their children…the social support before… is very key…this journey is crucial and needs support through it…even counselling and prayers"*	FGD 2

Components of PCC

Themes	Quotes/features	FGD Number
Nutritional support	*"Nutrition is very important for foetus…care before pregnancy should therefore include balanced diet, … vitamin supplements like folic acid, …."*	FGD 1
	"...the couples they are taken through nutritional support, use of mineral supplements"	FGD 2
Environment	*"The environment should be stress free environment, enough sleep and rest"*	FGD 1
	"…hata kuhama nyumba hadi ingine (even moving houses) can be important for the baby that a mother is planning to carry…like me, when I wanted to get my first born, I had to move house from one that was close to Kachok dump site to one in a cleaner environment… nilijiambia NO (I said NO), my baby needs a better environment during pregnancy and after…what if the dumpsite smell could make me feel worse than the pregnancy itself…? What if the dumpsite has bad chemical entering our borehole water that could affect my baby in the womb…? environment ni muhimu (is important) …"	FGD 2
Diagnostic Tests for conditions that could affect pregnancy	*"Some of the important things to consider for this care is tests to rule out any genetic conditions, like sickle cell carrier status in parents, tunajua vile (we know how) some of the genetic conditions are hard to live with…so if you can do a test to help in making partner or pregnancy decision before it happens the better"* *"…you should rule out STIs, HIV and anemia…if a couple wants to partake this journey…"*	FGD1
Mental and Physical Health	*"Physical and mental health care given to women before conceiving a child"* *"you should … even confirm psychological, emotional, physical fitness … if a couple wants to partake this journey*	FGD 1

Treatment	*"In preconception care, the treatable conditions should be treated …" "…anemia, TB, Syphilis and other STIs should be treated before a mother decides to get pregnant"* *"…those of us in HIV care insist on preconception care because HIV puts any pregnancy at risk for the mother and the unborn child…therefore were advocate for initiation on HAART, reducing the viral load to lowest possible levels and treating other … co-infections of HIV…even HB has to be brought to acceptable levels"* *"…this care involves provision of … medical … care to mothers before they get pregnant…"*	FGD 1
	"…wale wako na shida inafaa watibiwe isifike wakati wa mimba na bado wako na hiyo shida (those with a problem should be treated so that the problem does not proceed to pregnancy)"	FGD 2
Counselling	*"…and counselling given for those that cannot be treated so that the couple are aware of the risks of getting pregnant and they remain to make the decision"* *"…counselling on enough sleep and rest, balanced diet"*	FGD 1

Importance of PCC

The discussants felt that preconception care was an important component of the continuum of maternal care. This was illustrated in the following comments which explained the importance of providing these care

Themes	Quotes/features	FGD Number
Psychological preparation of mother for healthy pregnancy	*"...because it helps prepare the mother psychologically on what to expect ... paves way to a healthy pregnancy"* *"The mother gets psychological counselling, counselling on laboratory outcome..."* *"" ... if need be counselling on family planning...in HIV care, we advocate family planning until the mother and father are in right health status for pregnancy...so tunawaambia watumie (we tell them to use) FP till they are ready health wise to get pregnant"*	FGD 1
Diagnosis and Treatment of pregnancy endangering conditions	*"... thorough history of medical, surgical, psychosocial, genetic and nutrition ...it can be a pointer to conditions that could complicate pregnancy"* *"...laboratory testing, screening for STI, cervical cancer screening, HB level, cardiovascular disease screening, UTI screening, HIV screening are important part of preconception care...they provide insights on what can be dealt with before a couple decides on getting pregnant"* *"... screening for medical conditions, i.e., anaemia, HIV"* *"HIV client's viral suppression, stoppage of contraceptive use..., physical check-up eg status of reproductive organs, treatment of underlying diseases".*	FGD 1
	"*...like starting folic acid orals and taking iron supplements for anemia can help in making sure the mother's body and health are ready for the baby"*	FGD 2
Health Education	*"...frequent visits to the health care provider...also enables the nurse to give appropriate messages and advise to the couple"* *"... new couples can be taught essential baby care before they conceive"* *"... gives the couple opportunity to ask questions especially if they have pre-existing condition that can put pregnancy at risk"* *"...couple might need genetic counselling and education because of being carrier of a condition like sickle cell disease"* *"...also, information giving...like acceptable health maintenance activities for example physical exercise can be taught to the couple"*	FGD 1
	"... joma mine inyalo puonj ikruok mar nyuol kata pok gi mako ich (the women can be taught birth preparedness even before they get pregnant)	FGD 2

Family planning advice	*"…family planning is also important for preconception care. Some conditions like miscarriage need advice for the mother to use FP at least 6 months. Ndio mwili ikuwe (so that the body can be) ready kwa mama kupata mimba tena (for the mother to get pregnant again).* *" Stoppage of family planning"* *"Asking about reproductive intentions to ascertain risks of unplanned pregnancies"* *"Discuss methods of family planning and offer them as per client's choice"*	FGD 1
Improves maternal and neonatal outcomes	*"determines the outcome of the unborn baby"* *"...prepares the couple obtain a healthy conception, pregnancy and delivery"* *"To prevent unnecessary complications e.g., congenital diseases, HIV e.t.c and for the general wellbeing of the mother and baby"* *"It improves health status. It reduces behaviours and individuals and environmental factors that could contribute to maternal and child health outcomes"* *To prevent unforeseen complications during pregnancy and childbirth"*	FGD 1
	"…rit ma imiyo mine kapok omako ich geng'o shida manyalo biro ne mama kata nyathi during pregnancy period (the care given to a mother before pregnancy prevents problems that may occur to the mother or baby during pregnancy). *"can prevents foetal abnormalities"*	FGD 2
Builds trust	*"… it is helping both the caregiver to meet the needs of the client and the client to have confidence in the caregiver to obtain optimum health."* *"…because my clients are always free, we share a lot and I always serve them as per their need."*	FGD 1

Further the discussants demonstrated good knowledge on what made up the preconception care package

When asked whether they found it easy to provide preconception care, there were varied responses. But there was a clear indication that there was low demand for the service because most clients seek care after they are pregnant and this could be related to lack of

awareness. Some discussants felt they lacked enough knowledge to enable them to provide this care. One felt that they were constrained by lack of resources. This is further elaborated by the comments here with. Some thought it was time wasting as they were already strained with other work.

Themes	**Quotes/features**	**FGD Number**
Time wasting	*"... because it's time wasting for the care giver... why should you offer what is not in your performance contract and the way we're already strained with UHC (Universal Health Care)"*	FGD 1
PCC is not a reportable indicator	*"I have difficulty in repackaging pre conception care because it is not a mainstream indicator...we don't even report clients who have come for the care"*	FGD 1
Low awareness	*"... most patients are not aware of its importance thus don't come to seek the care. As our health system is, we don't go looking for clients, the clients come to us"* *"Apparently not many clients opt for this service. We meet most of our clients already pregnant."*	FGD 1
	"Community is not aware so a few seek the services. There is need for sensitization"	FGD 2
Inadequate Knowledge	*"...because I do not have the knowledge to screen and provide the services"*	FGD 1
Inadequate resources	*"...but limited resources limit the health care providers for providing the care"*	FGD 1
Non-disclosure of intention to get pregnant	*"... most women or clients don't usually disclose to healthcare providers when they are intending to conceive."* *"...but the challenging bit is that most pregnancies are not intended or planned"* *...and again, it is not possible until the mothers declare their intentions for pregnancy"*	FGD 1

When asked, "What do you need to be done or provided to help you be able to provide this care well"? There were several suggestions including on job trainings, creating public

awareness for the service, hiring community health workers to create demand for the service, availing commodities specific to preconception care, provision of guides to use during provision of services. This emphasizes that development of intellectual capital for preconception care was considered a solution for improving delivery of preconception care services.

Themes	Quotes/features	FGD Number
Staffing	*"…there is need for more staff especially laboratory technologist to help in the screening of diseases such as syphilis."* *"the staff who are available are already strained, any additional responsibility like this care needs addition of more staff"*	FGD 1
	"…hire community health workers who will visit pregnant women at home."	FGD 2
Sensitization	*"…the community needs to be sensitized for the need to access the service. Where the service might be available you will find it is underutilized. Only when someone has a reproductive problem like infertility, that's when they seek the care."* *"Sensitization on the importance of preconception care to our community members"* *"…demand for the care needs to be created by letting people know its importance and having preconception targeted outreaches."*	FGD 1
Outreach	*" more outreaches to be carried out, parents to be informed about preconception care, those with children who are school going age and may shy off from seeking the care at facilities. Follow up of clients on preconception care to be done as home visiting"*	FGD 2
Training of available staff	*".. the available staff can be done for on job training on concepts of preconception care"* *"…the health workers themselves need to be enlighten on its importance so that they can prioritize it even in the day-to-day routines "* *"… the staff need to be provided with a clinical guide or*	FGD 1

	protocol for providing this care."	
Technologies	*"… logistics e.g., lab reagents, drugs, human resource and stationery among others need to be provided. What if the client come to you and you don't have what it takes to offer the services? There is where part of the problem lies"* *"Skills, knowledge, resources like IEC (Information Education and Communication) materials, space…necessary commodities have to be adequate"*	FGD 1
Systems support	*"Unless the care becomes the priority of the ministry of health, it can see support that is needed. The government has to plan to have preconception care as core. This can be though budgeting for it, providing protocols and even setting targets to be achieved"*	FGD 1

CHAPTER FIVE
DISCUSSION OF THE FINDINGS

5.1 Introduction

This chapter presents this study's deductions on the findings presented in the previous chapter and comparing them with previous studies done and drawing conclusions.

5.2 Objective 1: The rate of preconception care provision in Kisumu County

This study utilized intellectual capital theory to examine the capacity of health facilities in Kenya more specifically in Kisumu County to provide preconception care services. The study realized that there was no specific PCC program. The overall level of provision of the various interventions that make up the preconception package was 39%. This was considerably high compared to other studies done in Africa. A study done in Ethiopia estimated it at 15% (Kassa et al., 2019). The sample size of this study was larger (n=634) which could have increased the precision of the findings. Secondly, to measure implementation the study administered questionnaires to health providers while the current study sampled and interviewed representative of facilities.

These services were being provided individually and not as a package as recommended by the WHO. This is the lack of standardization of care, an issue that was also highlighted by Lassi et al 2014 is of concern (Lassi et al., 2014). Further a fragmented health care service delivery system, by way of lack of a comprehensive preconception care program, is a barrier to uptake of preconception care (M'Hamdi et al., 2017). Nevertheless, this ability to offer these services in isolation is an opportunity to create a sustainable comprehensive program. This is so because, other scholars have noted that causes of unhealthy birth growth and

development are interwoven and that addressing them one at a time can solve only a small fraction of the problem (Dubei, 2014). Moose et al, 2008 recommended routine care to maximize on the gains of preconception care for better maternal outcomes (Moose & Cefalo, 2008). In Africa, South Africa have included it as a routine in the continuum of maternal care (Republic of South Africa, 2015).

Self-reported prevalence of preconception care was 37.4%. This is in agreement with several studies which estimated prevalence of engagement with preconception care ranging between 15 % and 45% (Ayalew et al., 2017; Bright & Dipietro, 2019; Kallas-Koeman et al., 2012; Kassa et al., 2018; Mittal et al., 2014; Shadab et al., 2017; Tripathi et al., 2010; Zhu et al., 2012). This rate is low considering it may have been overestimated since it was based on self-reports and not observed rate. But it is comparable to the one derived from checklist. Further, it is suboptimal considering the impact of preconception care on pregnancy outcomes. Preconception care should be implemented as guided by the blue print for dissemination of high evidence-based practices in health care (Braspenningx, Haagdorens, Blaumeiser, Jacquemyn, & Mortier, 2013; Chen et al., 2004).

5.3 Objective 2: Human capital and its influence on preconception care

From the study 55.6% (n=471) of health workers were found knowledgeable on preconception care. This is considerably higher than other studies done in Africa. A finding collaborated by the focussed grouped discussion, which demonstrated that the health workers had a good grasp of what PCC was. A study in Egypt reported knowledge level of 22% (Ayalew et al., 2017) for all health workers while another one in Ethiopia estimated it

at 31% (Kassa et al., 2019). The latter study further revealed that those health workers who reported access to internet were significantly knowledgeable than the others. Thus, the difference could be attributed to the fact that the questionnaires for this study were self-administered and there was a possibility of access to information from internet via mobile technology. Nevertheless, the highest number of health workers who were found knowledgeable at 76.3 % (n=20) were Doctors. This is congruent with a study in Taiwan which found the level of knowledge of General Practitioner, a cadre similar to doctors, to be 75% (Genius & Genius, 2016). This high level of knowledge in this cadre could be attributed to the length of training and consequently the depth the curriculum delved into preconception information. The level of knowledge was higher among those providers from referral facilities (level 4 and 5), 76.7% (n=201), than those in primary level facilities (level 2 and 3), 23.3% (n=61). This is in agreement with another study, which demonstrated that the knowledge level was higher among those workers working in bigger facilities (Kassa et al., 2019). Further the staff indicate that they have never had any formal updates on preconception care, they also had varied views about the adequacy of the training received at their training institutions. Most of the doctors (65.4%) felt their training was adequate compared to the overall figure of 46.5%. This level of knowledge and it felt adequacy could be related to the number of years of training for this cadre of health workers, implying the depth of interaction with preconception care content. Thus, to bring bridge this gap in knowledge within the health worker population, in service training programs or updates are necessary. This was further supported by the opinions given by the health providers who

were included in the focused group discussions. They felt that on job training could be a solution to the challenges they face in providing preconception care.

On perceptions, 86.4% (n=469) of the staff appreciate that preconception care is as important as the other health packages like ANC in the continuum of maternal health care. Which is different and favourable considering other studies like Mazza et al 2013 where health workers indicated that preconception care was the least in of their priorities in their daily workloads (Mazza et al., 2013). The health workers also believed that a hospital setting is adequate to provide the care (67.4%, n=469) and felt that PCC is should be a priority in their daily workload (49.5%, n=469). The study demonstrated that these perceptions significantly influenced provision of preconception care (t=2.01, DF=73.40 P=. 048, & t=2.75, df =141 *P*=0.007).

Many note that there is inadequate time to provide PCC (41%) while a good number (22%) were unsure. The aspect of time was also brought out during the focussed group discussions as reason why the care was not being provided as recommended (‘*-because it's time wasting for the care giver’).* Lack of enthusiasm on the part of health workers was identified as one of the major barriers for provision of preconception care (M’hamdi et al., 2017; MOH, 2010b). This lack of enthusiasm could be related to inadequate rewards for effort, heavy workload putting pressure on time resource and unsupportive environment. This was also suggested by a study that demonstrated that health providers who earned higher pay were likely to provide PCC (Kassa et al., 2019).

About 81.6% of the doctor interviewed expressed confidence in their ability to provide comprehensive PCC while only 29.9% and 20.8% of the nurses and lab technicians felt competent respectively. Further, the study was able to demonstrate that the felt incompetency to provide this care negatively influenced its provision (t (469) = -2.35, p=0.02). This result was collaborated by the comment '- *'-because I do not have the knowledge to screen and provide the services'* when the discussant was asked the reason why they were not providing care in the focused group discussion. This is true, considering health workers don't practice what they do not know. Knowledge is an important predictor for implementation of preconception care (Kassa et al., 2018). From this study in Ethiopia poor PCC knowledge had 4 times higher odds of not practicing PCC. Investing in human capital through in-service training is important. This is so because health workers are primarily responsible for putting up-to-date evidences into practice preconception care included (Kassa et al., 2018).

An independent-samples t-test was conducted to compare the provision of PCC and various characteristics of the health care providers. There was a significant difference in the means for cadres of nurses (M=70.04, SD=8.951) and non-nurses (M=71.90, SD= 8.732); t (232) =2.23, P = 0.026. These results suggest that the cadres of health workers influence provision of PCC. Specifically, our results suggest that nurses were less likely to provide care. This is in keeping with another study that concluded that nurses and midwives had 2 times higher odds of not providing preconception care. This may be so because nurses are found in all levels of facilities and form the larger proportion of health workers. Strategies to increase provision of PCC targeting nurses may have the greatest impact.

This study was able to demonstrate that working experience of the health workers negatively influenced provision of PCC. This mean provision of PCC among those with less than 5 years of experience was higher than that of those who had worked for more than 5 years (M=72.04, SD=8.417 and M=69.89, SD=9.283, respectively (t (464) = -2.79, *P* =.005). This is unusual since it's appreciated that clinical experience increases prowess in practice. But then, preconception is a relatively new concept, which may have not been, include in the curriculum for those who underwent their basic training before the 21st century. Thus, the need of in-service training or updates on current issues including PCC. A deduction also expressed by a discussant during the focused group discussion ……*On job training on concepts can help me provide care...* FGD 1.

5.4 Objective 3: Structural capital and its influence on PCC implementation

Structural capital is codified knowledge present in procedures, databases, manuals and guidelines. This study was seeking to establish availability of such codified knowledge specific to preconception care service delivery. The structural capital investment was at 38.5%. This is suboptimal considering previous studies had shown higher rates of self-reported PCC engagements among providers who had guidelines on PCC (Kassa et al., 2018). Many other studies have recommended development of specific checklists and guidelines with PCC content to facilitate implementation of PCC (Braspenningx et al., 2013; Ebrahim et al., 2006).

Whereas the study was not able to find any IEC to alert the public of the PCC and Guidelines, the other aspects of structural capital (protocols or checklists on PCC or

inclusion in service delivery charter and HMIS) were available for particular interventions or service packs. “Inclusion of PCC interventions in the health information systems’ was the most prevalent structural capital at 45% and inclusion in the budget was the lowest at about 30%. The structural capital for PCC was higher in level 4 and 5 at 47% compared to level 2 and 3 facilities which was at 30%. Others have also recommended structuring PCC by including it in the health information systems (Braspenningx et al., 2013). It was also realized that PCC was not included in the daily work load for the relevant health workers.

Nevertheless, when assessed individually, various service provided relevant to preconception care had components of structural capital developed. Supplies required in the provision of PCC were available including folic acid, IFAS and iron. For instance, structural capital for vaccination was 75% (=28) in primary level facilities while it scored even higher in referral facilities at 92% (n=28). This was very high compared to another study in Ethiopia, which showed 0% (n=632) implementation of vaccination intervention (Kassa, 2019). The difference could have been in the phrasing of the questions where the current study was interested in availability while the latter study was asking whether women were actually being provided this service as part of a preconception program. Possibly, the difference could have been the respondents to the tools in the two studies.

Other services whose structural capital was high included general counselling, HIV prevention and management, nutritional interventions, prevention of unwanted pregnancies, genetic counselling, and diagnosis and management of certain chronic illnesses. These services can easily be packaged and offered to preconception care clients since most of the

facilities had ready structural capital for them. Thus, provides an opportunity to embed a sustainable program of PCC implementation within the facilities. Such like opportunities can also include providing a screening questionnaire to all women in childbearing age seeking any other services within the hospitals (American College of Obstetricians and Gynecologists, 2013). Meanwhile the services whose structural capital was found in very few hospitals included tobacco use prevention 10 % (n=28), environmental risk exposure 0% (n=28), infertility and subfertility management among others. These gaps in structural capital may need to be addressed to allow them to be included in the PCC package for the current setting.

The study demonstrated that the KEPH level of the facility (OR=2.66, CI=1.11-6.36, *P*=0.023), the location (OR=2.66 CI=1.11-6.36, *P*=.023) and type of services offered (OR=0.38 CI=0.16-0.90, *P*=0.035) influenced the availability and consequent utilization of the procedures in provision of PCC. This is similar to a previous study, which revealed that women who received preconception care in either a healthcare center or the community developed the appropriate behavioral changes as a result of the preconception care provided (Dean et al., 2014). Facilities that had both outpatient and inpatient services were more likely to offer more procedures than those with outpatient only. Facilities that offer both inpatient and outpatient services are referral facilities that is, the sub-county and county (level 4 and 5). These facilities have the full range of cadres of health workers including doctors. And as earlier mentioned, doctors demonstrated a higher likelihood to provide care because they felt competent and were found knowledgeable. This highlighted the need to develop structural capital for the lower levels of services delivery a deduction which was

further supported by a discussant in the focused group discussions who suggested that hiring and training community health volunteer can help improve delivery of preconception care.

The results also revealed that inclusion of PCC aspects in HMIS reporting system b=0.66, t (232) =2.23, *P*=.036 was a significant determinant of PCC provision. This is in agreement with Braspenningx et al. (2013), who proposed that it is necessary to include PCC aspects in the health information systems so as to encourage provision of this care (Braspenningx et al., 2013).

5.5 Objective 4: Relational capital and PCC implementation

Relational capital is defined as "knowledge resources embedded within, available through, and derived from networks of relationships between peers, customers, suppliers, and business associates" (Cousinsa, Handfield, Lawson, & Petersend, 2006; Subramaniam & Youndt, 2005). In this study, relational capital was conceptualized as clients' satisfaction with current services offered, there level of awareness for preconception care, their readiness to receive preconception care services if offered as well as other stakeholders.

The results show that the clients were significantly satisfied by the services, which they were receiving at that time. These is advantageous because history of good service delivery is an important predictors of health seeking behavior, in this case, acceptance of preconception care (Latunji & Akinyemi, 2018). Further those who lived further away from these facilities were less likely to be satisfied with services (OR=0.49, *P*<.001). This could be due to the strain the individuals experience to reach care. This points to the need to bring care closer to them. Moreover, bringing preconception care services closer by training community health

volunteers to provide preconception care counselling could help promote uptake of this service as suggested by the discussants in the focused group discussion in section 4.7. The suggestions reported verbatim were '*More outreaches to be carried out, parents to be informed about preconception care, those with children who are school going age and may shy off from seeking the care at facilities. 'Follow up of clients on preconception care to be done as home visiting" 'Hire community health workers who will visit pregnant women at home').*

The results showed that clients with various characteristics were ready to seek care. Those who were older than 25 years of age (OR=0.48, *P*<.001), this can be associated to the fact that advancing in age influences health seeking behavior as seen in another previous study (Bhat, Sowmya, Kumar, & Saurabh, 2017). This is beneficial considering that issues arising from lack of preconception care increase with age and thus this care is even more relevant to this particular population.

The study demonstrated that those who had a higher level of education, (OR=2.42, *P*<.001), were more likely to readily accept preconception care if offered. This could be due to the fact that high literacy levels influences the health seeking behavior of individuals (Latunji & Akinyemi, 2018). But then, this is different from another study which showed that women of low literacy were more interested in preconception care (Fransen, Hopman, Murugesu, Rosman, & Smith, 2018).

Further women who resided in rural areas were more likely to receive care if offered as compared to urban dwellers (OR=1.641, *P*=0.014). This can be an opportunity to capitalize

on by promoting community-based preconception care provision. Those women who had previous pregnancies were more than twice likely to accept care (OR=2.45, *P*=0.003). This suggests that efforts to promote this care in maternity units can improve its uptake.

The level of awareness on preconception care was relatively low at 57% taking into consideration that those clients who have ever heard of preconception care were more than 5 times likely to accept care if offered compared to those who had not (OR=5.58, *P*<0.001). Lack of awareness among the clients and health providers was identified as a challenge to delivery of this care during the focused group discussion as evidenced by the following comment. *Clients are not aware so a few seek the services. There is need for sensitization".* Creating awareness was identified as one of the solutions to improve preconception care service delivery *("Sensitization and mobilisation of general public to seek the service').* Other studies have also demonstrated the importance of awareness in improving delivery of preconception care (M'hamdi et al., 2017).

During the literature search the study was able to elucidate that preconceptions issues have not been delved at adequately by the government policies in Kenya. For instance, the National Reproductive Health Policy of the Government of Kenya aimed at enhancing the reproductive health status of all Kenyans by increasing equitable access to reproductive health services and by improving the quality, efficiency and effectiveness of the services at all levels (MOH, 2009). Unfortunately, it fails to underscore the gap for preconception care and this lack of emphasis could have influenced no prioritisation of preconception care and consequent poor delivery of the services.

CHAPTER SIX
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.

6.1 Summary

This study was proposed to estimate the rate of preconception care provision and to determine how it is influenced by the health workers as human capital, the internal (structural capital) and external environment (relational capital) in health facilities in Kisumu County of Kenya. The results show low rate of PCC provision at 39%. Further, the study confirmed that intellectual capital influenced provision of health care and in this case PCC. It also emphasizes the need of providing PCC as a package in a comprehensive program.

Human capital investment on preconception care is low in the study setting. The results demonstrate that human capital is a determinant of preconception care provision. It specifically demonstrated the importance of various aspects of Human capital, i.e., knowledge, perceptions, competence and adequacy of training in provision of this care. Further, it showed that the nursing cadre has a higher probability to provide this care. And that training community health volunteers can improve uptake of the service.

The study also concludes that, the structural capital for PCC is inadequate but there are opportunities that can allow for easy embedding of a PCC program in the study setting. This is so because the facilities required to provide this care are available but require reorganization through formation of codified knowledge to maximize their potential in implementation of this care. These includes inclusion of PCC in the service charter and HMIS, creating routines, checklists and protocols to assist in its implementation.

Finally, the study concludes that relational capital is poor. This is so because the level of awareness on PCC for the target population is low. Nevertheless, there is opportunity since clients a show readiness to accept this care. Moreover, the study has demonstrated the client attributes that can promote uptake. These include rural settings, nearness to health facilities, having previous pregnancies and having heard about PCC. Linkage up was a shown to be a predictor for PCC provision, in these facilities.

6.2 Conclusions

i. Provision of PCC was relatively low at 39% and was influenced by investment in human capital, structural capital and relational capital.

ii. Poor knowledge, inadequate training and attitude (perceptions) of health providers can be a cause of low prevalence of preconception care engagements in this particular setting.

iii. Inclusion of PCC in the health information management systems and reporting tools can promote provision of preconception care.

iv. Availability of linkages up wards and downwards (including referral systems) influenced provision of PCC and the level of education, rural background, previous pregnancy, marriage and level of awareness increased readiness to receive PCC if offered.

6.2.1 New knowledge

The study was able to demonstrate that intellectual capital theory can be used to study health service delivery. It also demonstrated that investing in intellectual capital (structural, human and relational can increase uptake and improved provision of health services including preconception care. Further, offering the services at the primary health facilities can improve its uptake. The observational schedule drafted and used in this study can be used as a tool for evaluating the implementation of other services in the health care system.

6.3 Recommendations for policy and practice improvement

i. The study thus recommends investment on intellectual capital (human capital, structural capital, relational capital) in order to promote provision of preconception care in the study setting and similar settings.

ii. To build human capital, this study recommends holding frequent on job training and updates to increase knowledge and motivate health providers to increase PCC engagements.

iii. Drafting of manuals with information on preconception care and protocols to act as quick daily reminders, checklists to be used during sessions especially in the rural and primary level facilities.

iv. Creating awareness to the general public on preconception care is an important step to create demand for the service considering demand drives supply and highlighting preconception care in policy documents will enable prioritisation of these services.

6.4 Recommendation for future studies

i. Community based studies should be considered to further profile determinants of PCC provision and uptake in both rural and urban populations.

ii. Studies to test the applicability of the aforementioned observation checklist as a tool for assessing the implementation of other health care services for quality improvement.

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APPENDICES

APPENDIX 1: Evidence-based preconception care interventions to address health problems contributing to maternal and child mortality

Problems that can be addressed by preconception care interventions	Examples of evidence-based interventions
Nutritional deficiencies and disorders	• Screening for anaemia and diabetes • Supplementing iron and folic acid • Information, education and counselling • Monitoring nutritional status • Supplementing energy- and nutrient-dense food • Management of diabetes, including counselling people with diabetes mellitus • Promoting exercise • Iodization of salt
Vaccine-preventable infections	• Vaccination against rubella • Vaccination against tetanus and diphtheria • Vaccination against Hepatitis B
Tobacco use	• Screening of women and girls for tobacco use (smoking and smokeless tobacco) at all clinical visits using "5 As" (ask, advise, assess, assist, arrange) • Providing brief tobacco cessation advice, pharmacotherapy (including nicotine replacement therapy, if available) and intensive behavioral counselling services • Screening of all non-smokers (men and women) and advising about harm of second-hand smoke and harmful

Problems that can be addressed by preconception care interventions	Examples of evidence-based interventions
	effects on pregnant women and unborn children
Environmental risks	• Providing guidance and information on environmental hazards and prevention • Protecting from unnecessary radiation exposure in occupational, environmental and medical settings • Avoiding unnecessary pesticide use/providing alternatives to pesticides • Protecting from lead exposure • Informing women of childbearing age about levels of methyl mercury in fish • Promoting use of improved stoves and cleaner liquid/gaseous fuels
Genetic disorders	• Taking a thorough family history to identify risk factors for genetic conditions • Family planning • Genetic counselling • Carrier screening and testing • Appropriate treatment of genetic conditions • Community-wide or national screening among populations at high risk
Early pregnancies, unwanted pregnancies, and rapid successive pregnancies	• Keeping girls in school • Influencing cultural norms that support early marriage and coerced sex

Problems that can be addressed by preconception care interventions	Examples of evidence-based interventions
	• Providing age-appropriate comprehensive sexuality education • Providing contraceptives and building community support for preventing early pregnancy and contraceptive provision to adolescents • Empowering girls to resist coerced sex • Engaging men and boys to critically assess norms and practices regarding gender-based violence and coerced sex • Educating women and couples about the dangers to the baby and mother of short birth intervals
Sexually transmitted infections	• Providing age-appropriate comprehensive sexuality education and services • Promoting safe sex practices through individual, group and community-level behavioural interventions • Promoting condom use for dual protection against STIs and unwanted pregnancies • Ensuring increased access to condoms • Screening for STIs • Increasing access to treatment and other relevant health services
HIV	• Family planning • Promoting safe sex practices and dual method for birth control (with condoms) and STI control • Provider-initiated HIV counselling and testing, including

Problems that can be addressed by preconception care interventions	Examples of evidence-based interventions
	male partner testing • Providing antiretroviral therapy for prevention and pre-exposure prophylaxis • Providing male circumcision • Providing antiretroviral prophylaxis for women not eligible for, or not on, antiretroviral therapy to prevent mother-to-child transmission • Determining eligibility for lifelong antiretroviral therapy
Infertility and subfertility	• Creating awareness and understanding of fertility and infertility and their preventable and unpreventable causes • Defusing stigmatization of infertility and assumption of fate • Screening and diagnosis of couples following 6–12 months of attempting pregnancy, and management of underlying causes of infertility/sub-fertility, including past STIs • Counselling for individuals/couples diagnosed with unpreventable causes of infertility/sub-fertility
Female genital mutilation	• Discussing and discouraging the practice with the girl and her parents and/or partner • Screening women and girls for FGM to detect complications • Informing women and couples about complications of FGM and about access to treatment

Problems that can be addressed by preconception care interventions	Examples of evidence-based interventions
	• Carrying out defibulation of infibulated or sealed girls and women before or early in pregnancy • Removing cysts and treating other complications
Mental health disorders	• Providing educational and psychosocial counselling before and during pregnancy • Counselling and treating depression in women planning pregnancy and other women of childbearing age • Strengthening community networks and promoting women's empowerment • Improving access to education for women of childbearing age • Reducing economic insecurity of women of childbearing age
Psychoactive substance use	• Screening for substance use • Providing brief interventions and treatment when needed • Treating substance use disorders, including pharmacological and psychological interventions • Providing family planning assistance for families with substance use disorders (including postpartum and between pregnancies) • Establishing prevention programmes to reduce substance use in adolescents
Interpersonal violence	• Health promotion to prevent dating violence • Providing age-appropriate comprehensive sexuality

Problems that can be addressed by preconception care interventions	Examples of evidence-based interventions
	education that addresses gender equality, human rights, and sexual relations • Combining and linking economic empowerment, gender equality and community mobilization activities • Recognizing signs of violence against women • Providing health care services (including post-rape care), referral and psychosocial support to victims of violence • Changing individual and social norms regarding drinking, screening and counselling of people who are problem drinkers, and treating people who have alcohol use disorders

APPENDIX 2: Map of research area

Kenya Kisumu Map (Google Maps, 2017)

APPENDIX 3: Facility level preconception care provision checklist

Tool ID_____ District_____ Today's Date: Day___ Month_____/20__

Facility Name_____ Partner-supported facility Circle (Y /N) **Facility Level_____**

Interviewer Initials _____ Facility type Government Circle(Y/N) Faith Based Circle(Y/N) Private Circle(Y/N)

Estimate/Allocated Catchment Population for Women of Reproductive Age _____(Number)

Location of Facility Rural Circle (Y/N) Urban Circle (Y/N) Services _Inpatient and Outpatient Circle (Y/N)

Out of 10 preconception care areas, how many would you say have skilled preconception care providers

Out of 10 preconception care providers, how many would you say are competent preconception care providers

KEY

PROVIDED_YES- If service is available at least once per week **NO-**if not available. If PROVIDED is **NO** Skip to next service provision area

LINK_ UP (U) - If there is higher level referral facility **DOWN (D)-** If linkages Downwards are available eg CU/CHVs

PLAN_YES-If included in the service charter and or Strategic Plan **NO** if Not

BUDGET_YES-If budgeted for **NO-** if not

HMIS_YES - If in the reporting system **NO** if Not

IEC_YES - If information is displayed on the wall for clients to se **NO-** if information not Displayed

PROTOCOL_YES - If Protocols or guidelines in file or display are available **NO -** if Not Available

STAFF_YES - If staff adequately available for provision of the service **NO -** if staff not adequate.

FACILITY_YES - If facility is adequate for the service **NO -** if not available for the service

If **YES (Y)** - Indicate **1** if **NO (N)** indicate **2**

	SERVICE PROVISION AREA	LEVEL OF PROVISION																	
B	Nutritional deficiencies and disorders	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Screening for anemia																		
2	Diagnosing and Managing nutritional conditions																		
3	Screening for diabetes																		
4	Supplementing iron and folic acid																		
5	Information, education and counseling																		
6	Monitoring nutritional status																		
7	Management of diabetes, including counseling people with diabetes mellitus																		
8	Promoting exercise																		
9	Iodization of salt																		
C	Vaccine-preventable infections	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Vaccination against rubella																		
2	Vaccination against tetanus and diphtheria																		
3	Vaccination against Hepatitis B																		
D	Tobacco use	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Counseling on harmful effects of Tobacco on pregnant women and unborn children																		

2	Screening of women and girls for tobacco use using “5 As” (ask, advise, assess, assist, arrange)																				
3	Providing brief tobacco cessation advice																				
4	Pharmacotherapy (including nicotine replacement therapy, if available)																				
5	Screening of all non-smokers and advising about harm of second-hand smoke																				
E	Environmental risks	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY			
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		
1	Information on radiation exposure in occupational, environmental and medical settings																				
2	Provide Protection from unnecessary radiation exposure																				
3	Information provision on Avoiding unnecessary pesticide use																				
4	Protecting from lead exposure																				
5	Informing women of childbearing age about levels of methyl mercury in fish																				
6	Promoting use of improved stoves and cleaner liquid/gaseous fuels																				
F	Genetic disorders	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY			
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		
1	Taking a thorough family history to identify risk factors for genetic conditions																				
2	Family planning																				
3	Genetic counseling																				

4	Carrier screening and testing																				
5	Appropriate treatment of genetic conditions																				
G	Early pregnancies, unwanted pregnancies, and rapid successive pregnancies	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Keeping girls in school																				
2	Influencing cultural norms that support delayed marriage and consensual sex																				
3	Providing age-appropriate comprehensive sexuality education																				
4	Providing contraceptives and building community support for preventing early pregnancy																				
5	Contraceptive provision to adolescents																				
6	Empowering girls to resist coerced sex																				
7	Engaging men to critically assess norms and practices regarding GBV																				
8	Engaging men to critically assess norms and practices regarding coerced sex																				
9	Educating women about the dangers to the baby and mother of short birth intervals																				
H	Sexually transmitted infections	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Providing age-appropriate comprehensive sexuality education and services																				
2	Promoting safe sex practices through individual, group and community-level interventions																				
3	Diagnosing and Treating STIs e.g. Syphilis, Gonorrhea																				

	and Genital Ulcer Diseases																				
4	Promoting condom use for dual protection against STIs and unwanted pregnancies																				
5	Ensuring steady access to condoms																				
6	Screening for STIs																				
7	STI treatment and other relevant health services																				
I	HIV	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Family planning																				
2	Promoting safe sex practices and dual method for birth control and STI control																				
3	Provider-initiated HIV counseling and testing, including male partner testing																				
4	Providing ART for PMTCT, pre and post-exposure prophylaxis																				
5	Providing ART for pre-exposure prophylaxis																				
6	Providing ART for post-exposure prophylaxis																				
7	Providing male circumcision																				
8	Determining eligibility for lifelong antiretroviral therapy																				
J	Infertility and sub-fertility	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Creating awareness and understanding of fertility and infertility																				
2	Creating awareness on infertility and sub-fertility																				

	preventable and unpreventable causes																		
3	Defusing stigmatization of infertility and assumption of fate																		
4	Screening and diagnosis of couples following 6–12 months of attempting pregnancy																		
5	Management of underlying causes of infertility/sub-fertility, including past STIs																		
6	Counseling on infertility																		
7	Counseling for those diagnosed with unpreventable causes of infertility/sub-fertility																		
K	Female genital mutilation	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Hosting public forums on Discussing and discouraging the FGM																		
2	Screening women and girls for FGM to detect complications																		
3	Informing women and couples about complications of FGM and access to treatment																		
4	Providing corrective surgery for women with complications of FGM																		
5	Removing cysts and treating other complications of FGM																		
L	Mental health disorders	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Providing general mental health educational before and during pregnancy																		
2	Providing psychosocial counseling before and during																		

	pregnancy																				
3	Counseling and treating depression in women of childbearing age																				
4	Strengthening community networks for women t																				
5	Promoting women's empowerment																				
6	Improving access to education and or information for women of childbearing age																				
7	Reducing economic insecurity of women of childbearing age																				
M	Psychoactive substance use	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY			
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N		
1	Screening for substance use																				
2	Providing brief interventions and treatment when needed																				
3	Establishing prevention programs to reduce substance use in adolescents																				
4	Treating substance use disorders, including pharmacological																				
5	Providing psychological interventions for substance use																				
6	Changing individual and social norms regarding drinking,																				
7	Screening and counseling of people who are problem drinkers,																				
8	Treating people who have alcohol use disorders																				
9	Providing family planning assistance for families with substance use disorders																				

N	Intimate partner and Sexual violence	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Health promotion to prevent intimate partner violence																		
2	Providing age-appropriate sexuality education that addresses gender equality																		
3	Providing age-appropriate sexuality education that addresses human rights																		
4	Providing age-appropriate sexuality education that addresses sexual relations																		
5	Linking economic empowerment, gender equality and community mobilization activities																		
6	Recognizing signs of violence against women																		
7	Providing post-rape care, referral and psychosocial support to victims of violence																		
O	General Counseling	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Counseling on recommended minimum of 4 ANC visits for each pregnancy																		
2	Counseling on birth preparedness or preparation for delivery																		
3	Counseling about family planning																		
4	Counseling about HIV/AIDS																		
5	Counseling about use of ITNs to prevent mosquito bites and malaria																		
6	Counseling about breastfeeding																		
7	Counseling about newborn care																		

8	Counseling on postnatal care visits																				
P	Diagnosing and Managing	PROVIDED		LINKS		PLAN		BUDGET		HMIS		IEC		PROTOCOL		STAFF		FACILITY	
		Y	N	U	D	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
1	Rubella																		
2	Sickle Cell																		
3	Cytomegalovirus																		
4	Toxoplasmosis																		
5	Herpes Simplex																		

APPENDIX 4: Questionnaire (health workers)

Please read the questions carefully. Make your response by ticking the appropriate box, or writing your response in the space provided. Your answers will be treated in the strictest confidence. This questionnaire should take you 10 minutes to complete. Thank you for your response.

STAFF QUESTIONNANIRE

Tool ID_____ District_____ Today's Date: Day___ Month_____/20__
Facility Name_____ Facility Level ____ Partner-supported facility Circle (Y /N)
Interviewer Initials_____
Facility type Government Circle(Y/N) Faith Based Circle(Y/N) Private Circle(Y/N)
Location of Facility Rural Circle (Y/N) Urban Circle (Y/N)
Services _Inpatient and Outpatient Circle (Y/N)
Age_____ Sex_____ Cadre _____ Level of Education _____
Estimate/Allocated Catchment Population for Women of Reproductive Age _____(Number)
Sub-County _____ Facility _____ Area of Work _____
Position of the respondent _____ Facility Type _____Years of Experience
Out of 10 clients of reproductive age, how many have expressed need for preconception care _____
Out of 10 clients of reproductive age who have expressed need for preconception care how many would you say you satisfied their need for preconception care _____
Please list any 5 interventions provided in the bundle of preconception care services

1. …….
2. …….
3. …….
4. ……..
5. …….

Have had any training in the following areas in the past 12 months

1	Nutritional deficiencies & disorders of preconception relevance	Yes	No
2	Vaccine-preventable infections of Preconception relevance	Yes	No
3	Tobacco use and its relevance in preconception care	Yes	No
4	Environmental risks in preconception	Yes	No
5	Genetic disorders of preconception relevance	Yes	No
6	Relevance of planning for pregnancy	Yes	No
7	Sexually transmitted infections	Yes	No
8	HIV	Yes	No
9	Infertility and sub-fertility diagnosis and management	Yes	No
10	Female genital mutilation diagnosis and management	Yes	No

11	Mental health disorders of preconception relevance	Yes	No
12	Psychoactive substance use and effects on pregnancy	Yes	No
13	Intimate partner and Sexual violence	Yes	No
14	General Counseling on safe motherhood	Yes	No
15	Diagnosing& Managing diseases that can cause congenital problems	Yes	No

Kindly indicate your level of agreement with service listed below as priority for preconception by circling one number in the rubric provided: Key: 5- Strongly Agree, 4-Agree 3 Neither Agree nor Disagree 2 Disagree 1 Strongly Disagree

1	Vaccines for preconception care	1	2	3	4	5
2	Prevention of unnecessary pesticide exposure	1	2	3	4	5
3	Treating seasonal flu	1	2	3	4	5
4	Nicotine replacement for those addicted to tobacco	1	2	3	4	5
5	Condom provision to sexually active adolescents	1	2	3	4	5
6	Promotion of liquefies gaseous fuel as safe fuel	1	2	3	4	5
7	PMTCT	1	2	3	4	5
8	Diagnosis and treating depression	1	2	3	4	5
9	Diagnosis and treating Toxoplasmosis	1	2	3	4	5
10	Monitoring of nutritional status	1	2	3	4	5

Kindly indicate your level of agreement with the statements below as priority for preconception by circling one number in the rubric provided: Key: 5- Strongly Agree, 4-Agree 3 Neither Agree nor Disagree 2 Disagree 1 Strongly Disagree

1	Preconception care is as important as ANC	1	2	3	4	5
2	A hospital setting is the best place to provide preconception care	1	2	3	4	5
3	Preconception care is a high priority in my workload	1	2	3	4	5
4	There is not enough time to provide a preconception clinic	1	2	3	4	5
5	I do not have the appropriate skills to offer preconception care	1	2	3	4	5

Indicate whether you would provide highly competent care for a client seeking care under the following bundles of preconception care by circling one number in the rubric provided: Key: 5- Strongly Agree, 4-Agree 3 Neither Agree nor Disagree 2 Disagree 1 Strongly Disagree

1	Nutritional deficiencies and disorders of preconception relevance	1	2	3	4	5
2	Vaccine of preconception relevance	1	2	3	4	5
3	Tobacco use and its relevance in preconception care	1	2	3	4	5
4	Environmental risks in preconception	1	2	3	4	5
5	Genetic disorders of preconception relevance	1	2	3	4	5
6	Relevance of planning for pregnancy	1	2	3	4	5
7	Sexually transmitted infections	1	2	3	4	5
8	HIV	1	2	3	4	5
9	Infertility and sub-fertility diagnosis and management	1	2	3	4	5

10	Female genital mutilation diagnosis and management	1	2	3	4	5
11	Mental health disorders of preconception relevance	1	2	3	4	5
12	Psychoactive substance use and effects on pregnancy	1	2	3	4	5
13	Intimate partner and Sexual violence	1	2	3	4	5
14	General Counseling on safe motherhood	1	2	3	4	5
15	Diagnosing and Managing diseases that can cause congenital problems	1	2	3	4	5

State, if any, the MAIN obstacle to providing preconception care in your practice?

Thank you for taking your time to Participate in the study

I	For the following questions indicate your knowledge of availability of the following within your health facility	1	2	3	4	5		
1	Preconception care is included in my daily work plan	1	2	3	4	5		
2	There are fliers or posters in my facility that alert the public about PCC	1	2	3	4	5		
3	There are guidelines or checklists that aid me in provision of preconception care	1	2	3	4	5		
4	Are there specific documents in which I record preconception services I give	1	2	3	4	5		
5	Are there adequate supplies of drugs and supplements to use during provision of PCC e.g. folic acid	1	2	3	4	5		
J	Relational capital							
1.	There is a high level of awareness among my clients on PCC	1	2	3	4	5	1	
2.	There are organizations or individuals I know of that support provision of PCC If yes, which ones _____	1	2	3	4	5		
3	There are a specified referral systems for clients seeking PCC	1	2	3	4	5		
Thank you for taking your time to respond to the questions								

APPENDIX 5 :Exit interview for clients

CLIENT EXIT INTERVIEW ON PRECONCEPTION CARE

A **Tool ID**_____ **District**_____
Today's Date: Day___ **Month**_____**/20**__
Facility Name_____
Partner-supported facility Circle (Y /N) **Facility Level**_____
Interviewer Initials _____
Facility type Government Circle(Y/N) **Faith Based** Circle(Y/N) **Private** Circle(Y/N)
Location of Facility Rural Circle (Y/N) **Urban** Circle (Y/N)
Services _Inpatient and Outpatient Circle (Y/N)

B Age_____ Sex_____ Occupation _____ Residence_____
Level of Education _____ Average Monthly Income _____
Marital Status _____ Service delivery Area _____
Previous Pregnancies_____

C How long does it take you to the facility _____

D How much does it cost you from your place of stay to the facility KShs _____

E Have you ever heard of Preconception care YES NO

F **Have you ever been attended to () in this facility on any of the following areas during any other visit when not pregnant by any health care provider (when not pregnant)? If YES how satisfied were you with the level of care provided: Indicate by circling one number in the rubric provided beside the question**
Key: **1** for ***Very Dissatisfied***, **2** for ***Dissatisfied, 3*** for ***Neither Satisfied*** nor ***Dissatisfied***, ***4*** for ***Satisfied***, ***5*** for ***Very Satisfied***

	Service Bundle	**Provided**		**Satisfaction**				
1	Nutritional deficiencies and disorders that can affect pregnancy	Yes	No	1	2	3	4	5
2	Vaccines you can get before getting pregnant	Yes	No	1	2	3	4	5
3	Tobacco use and its effects on pregnancy	Yes	No	1	2	3	4	5
4	Environmental risks in preconception	Yes	No	1	2	3	4	5
5	Genetic disorders that can affect pregnancy	Yes	No	1	2	3	4	5
6	Relevance of planning for pregnancy	Yes	No	1	2	3	4	5
7	Sexually transmitted infections and their effect on pregnancy	Yes	No	1	2	3	4	5
8	HIV	Yes	No	1	2	3	4	5
9	Infertility and sub-fertility diagnosis and management	Yes	No	1	2	3	4	5
10	Female genital mutilation diagnosis and management	Yes	No	1	2	3	4	5
11	Mental health disorders of preconception relevance	Yes	No	1	2	3	4	5
12	Psychoactive substance use and effects on pregnancy	Yes	No	1	2	3	4	5
13	Intimate partner and Sexual violence	Yes	No	1	2	3	4	5
14	General Counseling on safe motherhood	Yes	No	1	2	3	4	5
15	Diagnosing and Managing diseases that can cause congenital problems	Yes	No	1	2	3	4	5

G **Does your culture allow planning for conception** YES NO

H **If you were to conceive would you visit this health facility for care on the following bundles of preconception care?**

	Service Bundle	**Provided**	
1	Nutritional deficiencies and disorders that can affect pregnancy	Yes	No
2	Vaccines you can get before getting pregnant	Yes	No
3	Tobacco use and its effects on pregnancy	Yes	No
4	Environmental risks in preconception	Yes	No
5	Genetic disorders that can affect pregnancy	Yes	No
6	Relevance of planning for pregnancy	Yes	No
7	Sexually transmitted infections and their effect on pregnancy	Yes	No
8	HIV	Yes	No
9	Infertility and sub-fertility diagnosis and management	Yes	No
10	Female genital mutilation diagnosis and management	Yes	No
11	Mental health disorders of preconception relevance	Yes	No
12	Psychoactive substance use and effects on pregnancy	Yes	No
13	Intimate partner and Sexual violence	Yes	No
14	General Counseling on safe motherhood	Yes	No
15	Diagnosing and Managing diseases that can cause congenital problems	Yes	No

Thank you for taking your time to respond to the questions

APPENDIX 6: Focus group discussion guide for nurses

Consent Process

Thank you for agreeing to participate. We are very interested to hear your valuable opinion on how well we provide preconception care to our clients and whether we are well prepared to do it.

- The purpose of this study is to learn how health workers provide preconception care, there perceptions on the care. We hope to learn things that the stakeholders can use to improve promote provision of preconception care.
- The information you give us is completely confidential, and we will not associate your name with anything you say in the focus group.
- We would like to tape the focus groups so that we can make sure to capture the thoughts, opinions, and ideas we hear from the group. No names will be attached to the focus groups and the tapes will be destroyed as soon as they are transcribed.
- You may refuse to answer any question or withdraw from the study at anytime.
- We understand how important it is that this information is kept private and confidential. We will ask participants to respect each other's confidentiality.
- If you have any questions now or after you have completed this discussion, you can always contact a study team member like me, or you can call the principal investigator whose names and phone number are on this form.
- Please check the boxes on page 2 and sign to show you agree to participate in this focus group.

Introduction:

1. Welcome

Introduce yourself and the note taker, and send the Sign-In Sheet with a few quick demographic questions (age, gender, cadre, and years at this facility) around to the group while you are introducing the focus group.

Review the following:

- Who we are and what we're trying to do
- What will be done with this information
- Why we asked you to participate

- If you are a supervisor, we would like to excuse you at this time

2. Explanation of the process

Ask the group if anyone has participated in a focus group before. Explain that focus groups are being used more and more often in health and human services research.

About focus groups

- We learn from you (positive and negative)
- Not trying to achieve consensus, we're gathering information
- No virtue in long lists: we're looking for priorities
- In this project, we are doing both questionnaires and focus group discussions. The reason for using both of these tools is that we can get more in-depth information from a smaller group of people in focus groups. This allows us to understand the context behind the answers given in the written survey and helps us explore topics in more detail than we can do in a written survey.

Logistics

- Focus group will last about one hour
- Feel free to move around
- Where is the bathroom? Exit?
- Help yourself to refreshments

3. Ground Rules

Ask the group to suggest some ground rules. After they brainstorm some, make sure the following are on the list.

- Everyone should participate.
- Information provided in the focus group must be kept confidential
- Stay with the group and please don't have side conversations

- Turn off cell phones if possible
- Have fun

4. Turn on Tape Recorder

5. Ask the group if there are any questions before we get started, and address those questions.

6. Introductions
    - Go around table: job here, where you were born

Discussion begins, make sure to give people time to think before answering the questions and don't move too quickly. Use the probes to make sure that all issues are addressed, but move on when you feel you are starting to hear repetitive information.

Questions:

1. Let's start the discussion by talking about what preconception care is all about?
2. Why do you think it is important to provide this care?
3. What does this care package include?
4. Do you find it easy to provide this care
5. What do you need to be done or provided to help you be able to provide this care well

Probes for Discussion:

- Knowledge on preconception care – set of interventions that aim to identify and modify biomedical, behavioral and social risks to the woman's health or pregnancy
- Knowledge of package to include
    - Reproductive health planning- need to space their pregnancies, delay there pregnancy and limit the number of births?
    - Provision of nutritional supplements- folic acid
    - Genetic counselling
    - optimization of weight and micronutrient status,
    - prevention and management of infectious diseases, and
    - Screening for and managing chronic conditions.
- Perceptions on importance – optimizing pregnancy outcomes
    - Challenges in implementation of this care
- Working conditions
    - Access to supplies, equipment, drugs
- Solutions to the cited challenges

That concludes our focus group. Thank you so much for coming and sharing your thoughts and opinions with us. We have a short evaluation form that we would like you to fill out if you time. If you have additional information that you did not get to say in the focus group, please feel free to write it on this evaluation form.

APPENDIX 7: Focus group discussion guide for community health volunteers

Consent Process

Thank you for agreeing to participate. We are very interested to hear your valuable opinion on how well we provide preconception care to our clients and whether we are well prepared to do it.

- The purpose of this study is to learn how health workers provide preconception care, there perceptions on the care. We hope to learn things that the stakeholders can use to improve promote provision of preconception care.
- The information you give us is completely confidential, and we will not associate your name with anything you say in the focus group.
- We would like to tape the focus groups so that we can make sure to capture the thoughts, opinions, and ideas we hear from the group. No names will be attached to the focus groups and the tapes will be destroyed as soon as they are transcribed.
- You may refuse to answer any question or withdraw from the study at any time.
- We understand how important it is that this information is kept private and confidential. We will ask participants to respect each other's confidentiality.
- If you have any questions now or after you have completed this discussion, you can always contact a study team member like me, or you can call the principal investigator whose names and phone number are on this form.
- Please check the boxes on page 2 and sign to show you agree to participate in this focus group.

Introduction:

7. Welcome

Introduce yourself and the note taker, and send the Sign-In Sheet with a few quick demographic questions (age, gender, cadre, and years at this facility) around to the group while you are introducing the focus group.

Review the following:

- Who we are and what we're trying to do?
- What will be done with this information
- Why we asked you to participate

- If you are a supervisor, we would like to excuse you at this time

8. Explanation of the process

Ask the group if anyone has participated in a focus group before. Explain that focus groups are being used more and more often in health and human services research.

About focus groups

- We learn from you (positive and negative)
- Not trying to achieve consensus, we're gathering information
- No virtue in long lists: we're looking for priorities
- In this project, we are doing both questionnaires and focus group discussions. The reason for using both of these tools is that we can get more in-depth information from a smaller group of people in focus groups. This allows us to understand the context behind the answers given in the written survey and helps us explore topics in more detail than we can do in a written survey.

Logistics

- Focus group will last about half an hour
- Feel free to move around
- Where is the bathroom? Exit?
- Help yourself to refreshments

9. Ground Rules

Ask the group to suggest some ground rules. After they brainstorm some, make sure the following are on the list.

- Everyone should participate.
- Information provided in the focus group must be kept confidential
- Stay with the group and please don't have side conversations
- Turn off cell phones if possible
- Have fun

10. Turn on Tape Recorder

11. Ask the group if there are any questions before we get started, and address those questions.

12. Introductions

    - Go around table: job here, where you were born

Discussion begins, make sure to give people time to think before answering the questions and don't move too quickly. Use the probes to make sure that all issues are addressed, but move on when you feel you are starting to hear repetitive information.

Questions:

1. Let's start the discussion by talking about what preconception care is all about?
2. Why do you think it is important to provide this care?
3. What does this care package include?
4. Do you find it easy to provide this care?
5. What do you need to be done or provided to help you be able to provide this care well

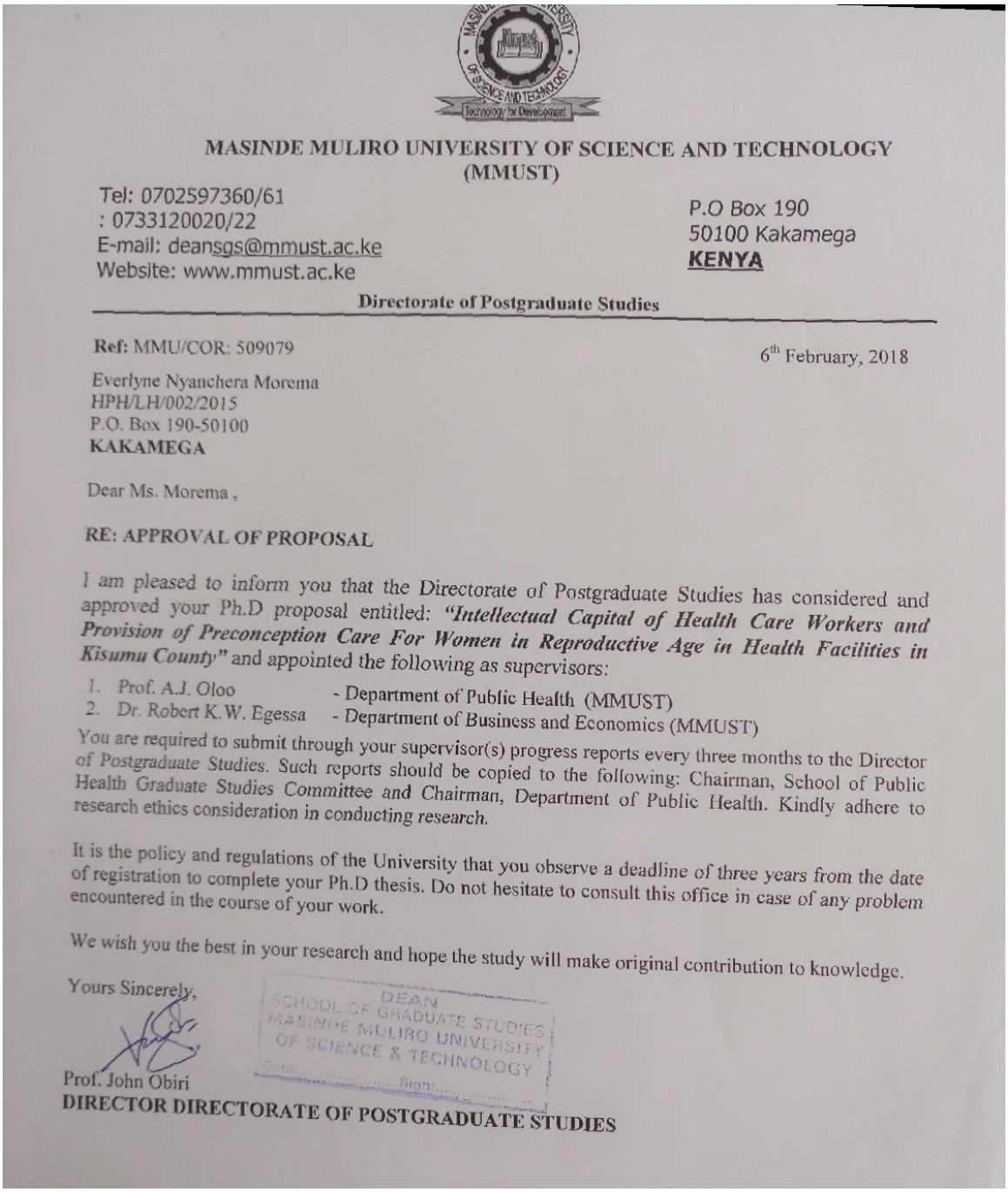
Probes for Discussion:

- Knowledge on preconception care – set of interventions that aim to identify and modify biomedical, behavioral and social risks to the woman's health or pregnancy
- Knowledge of package to include
    - Reproductive health planning- need to space their pregnancies, delay there pregnancy and limit the number of births?
    - Provision of nutritional supplements- folic acid
    - Genetic counselling

    - optimization of weight and micronutrient status,
    - prevention and management of infectious diseases, and
    - Screening for and managing chronic conditions.
- Perceptions on importance – optimizing pregnancy outcomes
    - Challenges in implementation of this care
- Working conditions
    - Access to supplies, equipment, drugs
- Solutions to the cited challenges

That concludes our focus group. Thank you so much for coming and sharing your thoughts and opinions with us. We have a short evaluation form that we would like you to fill out if you time. If you have additional information that you did not get to say in the focus group, please feel free to write it on this evaluation form.

APPENDIX 8: Letter of approval from school of graduate studies



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
(MMUST)

Tel: 0702597360/61
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Website: www.mmust.ac.ke

P.O Box 190
50100 Kakamega
KENYA

Directorate of Postgraduate Studies

Ref: MMU/COR: 509079

6th February, 2018

Everlyne Nyanchera Morema
HPH/LH/002/2015
P.O. Box 190-50100
KAKAMEGA

Dear Ms. Morema ,

RE: APPROVAL OF PROPOSAL

I am pleased to inform you that the Directorate of Postgraduate Studies has considered and approved your Ph.D proposal entitled: ***"Intellectual Capital of Health Care Workers and Provision of Preconception Care For Women in Reproductive Age in Health Facilities in Kisumu County"*** and appointed the following as supervisors:

1. Prof. A.J. Oloo - Department of Public Health (MMUST)
2. Dr. Robert K.W. Egessa - Department of Business and Economics (MMUST)

You are required to submit through your supervisor(s) progress reports every three months to the Director of Postgraduate Studies. Such reports should be copied to the following: Chairman, School of Public Health Graduate Studies Committee and Chairman, Department of Public Health. Kindly adhere to research ethics consideration in conducting research.

It is the policy and regulations of the University that you observe a deadline of three years from the date of registration to complete your Ph.D thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours Sincerely,

DEAN
SCHOOL OF GRADUATE STUDIES
MASINDE MULIRO UNIVERSITY
OF SCIENCE & TECHNOLOGY
Date ..... Sign .....

Prof. John Obiri
DIRECTOR DIRECTORATE OF POSTGRADUATE STUDIES

APPENDIX 9: Approval by county director

Everlyne N. Morema,

P.O. Box 7299-40100,

Kisumu.

Phone; +254721262748

evenyanchera@yahoo.com, emorema@mmust.ac.ke.

16th Feb. 2018.

Approved
24/2/18

COUNTY DIRECTOR OF HEALTH KISUMU

The County Director of Health,

Kisumu County.

Dear Sir,

RE: APPROVAL FOR DATA COLLECTION.

I intend to carry out a study entitled '*Intellectual capital of health workers and provision of preconception care for women in reproductive age at health facilities in Kisumu County*'. I hereby request for approval to collect the data as referenced above. The study is in fulfillment of my studies in health systems management in Masinde Muliro University of science and technology (MMUST).

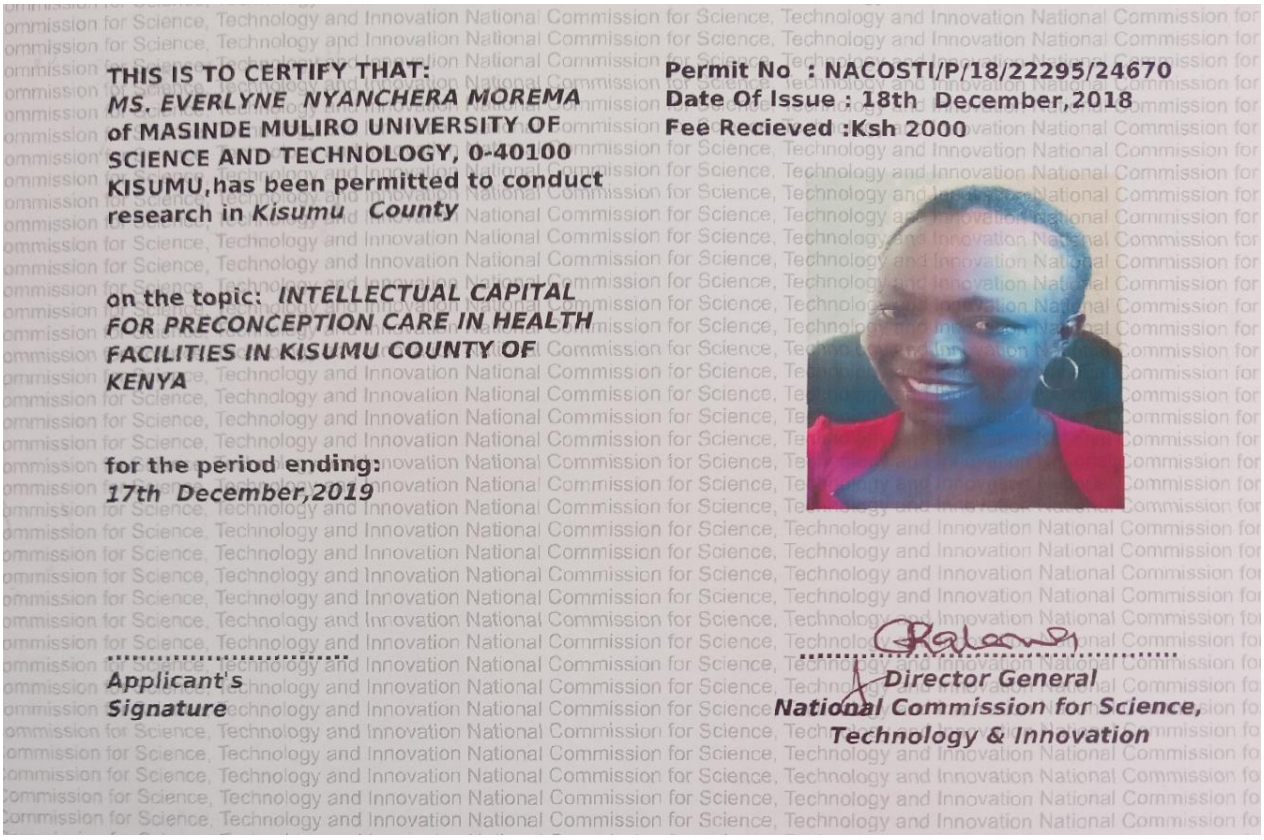
Attached is a copy of the research proposal with the ethical approval in the appendices for your perusal and detail. Looking forward to your favorable response.

Yours faithfully

Morema

Everlyne Nyanchera

APPENDIX 10: NACOSTI license



THIS IS TO CERTIFY THAT:
MS. EVERLYNE NYANCHERA MOREMA
of MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY, 0-40100 KISUMU,has been permitted to conduct research in *Kisumu County*

on the topic: *INTELLECTUAL CAPITAL FOR PRECONCEPTION CARE IN HEALTH FACILITIES IN KISUMU COUNTY OF KENYA*

for the period ending:
17th December,2019

Permit No : NACOSTI/P/18/22295/24670
Date Of Issue : 18th December,2018
Fee Recieved :Ksh 2000

APPENDIX 11:MMUST ethical approval

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

Tel: 056-31375
Fax: 056-30153
E-mail: rel@mmust.ac.ke
Website: www.mmust.ac.ke

P. O. Box 190
Kakamega
50100
Kenya

Institutional Ethics Review Committee (IERC)

MMU/COR: 403012 vol 2(5)

7th February, 2018

Everlyne Nyanchera Morema
Registration No. HPH/LH/002/2015
Masinde Muliro University of Science and Technology
P. O. Box 190-50100
KAKAMEGA

Dear Ms. Morema,

RE: ETHICAL APPROVAL TO CONDUCT RESEARCH

The IERC received your proposal titled "***Intellectual Capital of Health Care Workers and Provision of Preconception Care For women in Reproductive age in Health Facilities in Kisumu County***". The IERC, MMUST chapter therefore grants ethical clearance for you to conduct your research as proposed. In case of any adverse reactions to the patients, please report to IERC, MMUST.

On behalf of IERC and the University Senate, receive my congratulations. We wish you success in your research endeavour.

Yours faithfully,

Dr. Nguka Gordon
Chairman, Institutional Ethics Review Committee

Copy to:

- The Secretary, National Bio-Ethics Committee
- Vice Chancellor
- DVC (PR&I)
- DVC (A & F)
- DVC (A&SA)

APPENDIX 12: JOOTRH ethical approval

Telegrams: "MEDICAL", Kisumu
Telephone: 057-2020801/2020803/2020321
Fax: 057-2024337
E-mail: ercjootrh@gmail.com
When replying please quote

JARAMOGI OGINGA ODINGA TEACHING & REFERRAL HOSPITAL
P.O. BOX 849
KISUMU

Ref: ERC.IB/VOL.I/448

Date: 7th May, 2018

Everlyne Nyanchera Morema - MPH
HPH/LH/002/2015

Dear Everlyne,

RE: FORMAL APPROVAL OF THE PROTOCOL STUDY ENTITILED:-
INTELLECTUAL CAPITAL AND PROVISION OF PRECONCEPTION CARE FOR WOMEN IN REPRODUCTIVE AGE IN HEALTH FACILITIES IN KISUMU COUNTY"

The JOOTRH ERC reviewed your protocol and found it ethically satisfactory. You are therefore permitted to commence your study immediately. Note that this approval is granted for a period of one year (w.e.f. 7th May, 2018 to 7th May, 2019). If it is necessary to proceed with this research beyond approved period, you will be required to apply for further extension to the committee.

Also note that you will be required to notify the committee of any protocol amendment(s), serious or unexpected outcomes related to the conduct of the study or termination for any reason.

In case the study site is JOOTRH, kindly report to the Chief Executive Officer before commencement of data collection.

Finally, note that you will also be required to share the findings of the study in both hard and soft copies upon completion.

The JOOTRH – IERC takes this opportunity to thank you for choosing the Institution and wishes you the best in your endeavours.

Yours sincerely,

WILBRODA N. MAKUNDA
SECRETARY- IERC
JOOTRH - KISUMU

APPENDIX 13: Informed consent form

Information sheet

The following information is to enable you to give voluntary, informed consent to participate in this study. Please read the information carefully before signing the consent form (part B).To be verbally read for those who are not able to read.

Study title: HEALTH INTELLECTUAL CAPITAL AND PROVISION OF PRECONCEPTION CARE FOR WOMEN IN REPRODUCTIVE AGE IN HEALTH FACILITIES IN KISUMU COUNTY.

Investigators Names: Morema Everlyne Nyanchera

Address

Masinde Muliro University

P.O. Box 195,

Kakamega

Tel: 0721 262 748

Aim and Significance of the study

The purpose of this study is to explore the knowledge, perceptions and beliefs of reproductive health care providers and reproductive health care users regarding preconception care. The study will also explore the opportunities and system structures available that may enable implementation of search activities. This therefore will be a tool for reproductive health policy makers and program planners to enhance integration of preconception in the continuum of care.

What participation will involve

Upon enrolment in the study, you will be asked some questions on demographic data and socioeconomic activities which you will respond to as truthfully as you can and this will be tape recorded. In addition, a field assistant will ask you questions concerning the preconception care and services received. The interview will take at most 20 minutes. As a participant in this study, you will be required to give honest information to their level best. Participation is voluntary and refusal to participate will involve no penalty. You may withdraw from participating in this study at any time without giving reasons. There are no foreseeable risks and immediate benefits for participating in this study. The findings from this study will help improve service provision.

Data Security

All information you provide us will remain confidential. Only the study team will have this information and will be treated with confidentiality unless your express permission is obtained. This will not affect services you are receiving.

Consent Form

Please read the previous information sheet (or have the information read to you) carefully before completing and signing this consent form. Should you have any questions about the study please feel free to ask the investigator prior to signing your consent

Consent Form for the Study

INTELLECTUAL CAPITAL FOR PRECONCEPTION CARE PROVISION TO CLIENTS OF REPRODUCTIVE AGE ATTENDING CARE IN TIER 2-4 FACILITIES IN KISUMU COUNTY.

Investigators name: Morema Everlyne Nyanchera

Masinde Muliro University

P.O. Box 195,

Kakamega

Tel: 0721 262 748

FOR COMPLETION BY PARTICIPANTS

I have read the following sheet concerning this study and I understand what will be required of me if I take part in the study.

Any questions regarding this study have been answered by

……

I understand that at any time I may withdraw from the study without giving a reason and this will not affect the care am receiving at the hospital.

I AGREE TO TAKE PART IN THE STUDY:

Name of participant……

Signed……. (Or thumb print)

Date…….