THE EFFICIENCY OF COUNTY GOVERNMENTS' EXPENDITURE ON HEALTH IN KENYA

EDWARD ANTONY BULUMA

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DECLARATION

I declare that this project is my original work and has not been presented to any other university for the award of any degree

Signature... Date........24/11/21.......................

Edward Antony Buluma

Reg. No...X51/79676/2015..........

This research project has been submitted for examination with approval as university supervisor.

Signature.................................. Date.......25/11/21...........

Professor Wafula Masai

School of Economics

University of Nairobi

DEDICATION

I dedicate this project to my family, friends and classmates for their support.

ACKNOWLEDGMENT

I thank my supervisor, Professor Wafula Masai, for academic support all along. I am grateful to the entire University of Nairobi staff for the assistance and the vast and rich knowledge you gave me on my project writing. I thank God for the protection and good health during my entire project development.

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ACRONYMS AND ABBREVIATIONS

DEA : Data Envelopment Analysis

DMU : Decision making Units

EU : European Union

FGLS : feasible generalized least squares

FGLS : Feasible Generalized Least Squares

GoK : Government of Kenya

KCG : Kitui County Government

KNBS : Kenya National Bureau of Statistics

MoF : Ministry of Finance

MoH : Ministry of Health

OECD : Organization for Economic Co-operation and Development

OGP : Open Government Partnership

SDGs : Sustainable Development Goals

VIF : Variance Inflation Factors

WHO : World Health Organization

ABSTRACT

The study examined the efficiency of the county government's expenditure on health in Kenya. The theoretical review included the data envelopment analysis approach, allocation of resource theory and agency theory. Data was analyzed using descriptive and inferential statistics. The descriptive statistics included mean, standard deviation, minimum and maximum, while the inferential statistics entailed the panel regression model. The researcher relied on the data from the counties, the Commission on Revenue Allocation and the Ministry of Finance and KNBS from 2015 to 2019. The justification for choosing between 2015 and 2019 was that the counties were fully operational during this period, and most functions had been delegated to the counties from the national government. The study found the average efficiency score on county government's expenditure on health by the 47 county governments between 2015 and 2019 was 64.96%. The average efficiency score in 2015 was 65.57%, 66.65% in 2016, 63.83% in 2017, 62.61% in 2018 and 66.14% in 2019. The study found that Vihiga, Muranga, Nakuru and Lamu counties have an efficiency score of above 80% with 88. 91%, 86.80%, 86.65% and 83.06% respectively. The study further found counties such as HomaBay, Kilifi, Laikipia, Nandi, Tana River, Trans-Nzoia and Wajir have an average efficiency of less than 50% between 2015 and 2019 with 49.02%, 48.11%, 44.45%, 47.69%, 45.42%, 42.20% and 48.94% respectively. The study found that none of the 47 counties in Kenya is optimal on expenditure on health. The study found that grants and population size influence the county government's expenditure on health. It was found that grants and population explain 7% of the county governments' expenditure efficiency. The study established that grants are positively and significantly related to efficiency (β=.0215, p=.0174). The population size was negatively and significantly related to the efficiency (β=-.0148, p=.0373). It is concluded that counties in Kenya are not much efficient in expenditure on health. The average efficiency score for the 47 counties for 2015-2019 demonstrates that the county government is not much efficient and can therefore realize optimal output level by employing the same level of county expenditure on health. The study recommended that county governments look at strategies that will increase the grants. The study also recommended that the counties could sensitize the community on how to reduce the population size. The population size was found to be negatively related to efficiency. The higher population size might hinder the service delivery, thus lower the efficiency. It is also recommended that the national government ensure no health budget is diverted to other sectors if the allocation was meant to be used in the health sector. The study recommended more audits should be conducted within the counties to minimize the embezzlement of funds set aside for the provision of health.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

A people's health is an economy's much needed force for growth and development. It has been argued that unless an economy invested in the health of its population, achieving posterity will be disparate (Osakede, 2020). Striking examples from across the world reveal that a healthy population is more than likely to shape its economy's development pathways through education, scaling up of employability prospects for its population, that way driving the economy to meet societal needs (Boachie & Ramu, 2016).

However, as Kithinji (2019) has revealed, poor health accounts for the underdevelopment of a country due to limited exploitation of the available resources. Asante and Zwi (2017) posit that the improvement of health and health systems does not only enhance productivity but also improve the overall wellbeing of the people. This is because a healthy population is more likely to be innovative and productive. This is the reason countries heavily invest in improving the well-being of their people (Maddox, Bauchner & Fontanarosa, 2019). Globally, different estimates have been used to measure health. The use of infant and under-five mortality rate is not uncommon in most countries. This estimate has greater extent of diffusion in terms of acceptability, in matters to do with health (Otieno, 2016, Lane et al., 2018; Oloo, Atambo & Muturi, 2017).

Conventionally, it has been accepted that infant mortality is the death of a child who is aged less than one year; undisputable that under-five mortality has to do with the death of child who is aged less than five years (Kithinji, 2019; Borghi et al., 2018). Despite progress in health, the focus of the policymakers and the government has been to develop a mechanism that will improve the health of the people, notably, children (Nderitu, 2016; Tran & Vu, 2018). Towards this aspiration, it has been argued that attenuating child mortality has a direct outcome in expanding an economy's future growth and development pathways. Given these observations, the government has been allocating massive to the health sector to improve the health of the people. Efficiency of spending funds allocated is critical in determining the service delivery in the health sectors (Tchatchoua, 2018; Mbitcha, 2018; Chansa et al., 2019).

According to Muthui (2016) inadequate and inefficient health systems can constrain the general health of the population. Where health systems fail, the scale of child mortality worsens, complicating realization of a more sustainable future for all. In the centrally, the efficiency of expenditures by the government on the health enhances the overall wellbeing of people through increased accessibility and affordability of health services (Kilesi, 2018). The Sustainable Development Goals (SDGs) rely on the performance of the health component; SDGs on health are attainable in the presence of a functional system that is well funded and equipped, affordable and accessible by all (Boachie & Ramu, 2016). Achievement of the health component under the SDGs as espoused in the national development blueprints will require activation of a combination of intentional interventions. Some of the much-needed interventions include and are not limited to resource mobilization and prudence in use and allocation of the otherwise futile resources to reinvigorate the sector (Otieno, 2016). Obtaining health services is costly and thus, the government needs to pay attention to the efficiency of the counties (Lane *et al.,* 2018).

It has been observed that in most countries, the allocation of funds to the health sector takes the largest share. For instance, it costs the United States of America about USD 3.5 trillion, an equivalent of 18 percent of its GDP on health utilization (Maddox, Bauchner & Fontanarosa, 2019). In 2017, the European Union (EU) as a whole devoted 9.6% of their GDP to health care (OECD, 2018). The total health budget consumption for China is above 5.9 trillion yuan, which is an equivalent of USD 901.63 billion (Wei & Zhou, 2019). Japan, which is in the same league as the aforementioned countries, its spending on health reached 42.2 Trillion Japanese yen in 2017 (Nakatani, 2019). South Africa spent R200 billion on national and provincial health programmes in 2018 (Jonah, Sambu & May 2019).

The health sector in the country has been receiving a huge allocation from the treasury to enhance the health of the people. The health sector was allocated KSh 111.7 billion in the financial year 2020/2021 (Ministry of Finance & National Treasury, 2020). The health sector relies on several sources of funding including government, private firms and donors (GoK, 2015). Vision 2030 was developed to have a country that is prosperous and has a high quality of life (Mwenzwa & Misati, 2014). In the process of improving the overall livelihood of the people, the country aims to have a healthcare system that is efficient and affordable to everyone. Some parameters, such as population size and poverty index, are used to assess the amount to be allocated to a certain unit (McCullough & Leider, 2016).

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Population size is a measure that has been used by the government to allocate funds in a certain unit. As a basis for allocation of funds, population size ensures per capita benefit on the indented beneficiaries' vis-à-vis the budget. In driving shared prosperity, County Governments discharge their roles consistent with Article 203(d) of the Constitution (Oloo *et al.,* 2017). Nderitu (2016) has advanced the ideation of the poverty index as an estimate for the welfare of the general population, especially in identification and allocation of finance. It has been argued that poverty index can be an ideal measure for a people's developmental needs or even identification of existing societal disparities. When the poverty index is used, Mbitcha (2018) has posited, it eases spatial service accessibility to all while at the same time accounting for the implementation of the basic principles of intergovernmental fiscal transfers. The fiscal transfers provide adequate resources to in response to identified needs.

However, in most African countries, including Kenya, the efficiency of the most public hospital has been constrained (Barasa, Rogo, Mwaura & Chuma, 2018). Major constraints have to do with budgetary inadequacies, general art of inefficiencies in public expenditure. In Kenya, hospitals absorb the greatest proportion of the total health expenditure, which requires efficient use for maximum benefit to the population. There have been regular countrywide strikes of medics of the public hospital, citing poor working conditions and government's failure to address their grievances (Kithinji, 2019). Nevertheless, the knowledge about the efficiency of county governments' expenditure on health in Kenya remains scanty, thus forms the foundation of conducting the current study.

In this analysis, the efficiency was assessed using an output-input model. The Data Envelopment Analysis (DEA) was incorporated to estimate efficiency scores of the spending on health among the counties in Kenya. As estimation, DEA provides insights into the efficiency of Decision-Making Units (DMU) under estimation. These DMUs, as Chen and Jia (2017) have found are critical in managing resources (inputs) to produce the maximum result (output). The DEA calculated the health sector efficiency of the counties in Kenya. By using the DEA approach, the efficient county will be used as a reference benchmark for inefficient counties.

1.2 Statement of the Problem

The knowledge of the efficiency of County Governments' expenditure on health in Kenya remains scanty. As much as it could be known, thanks to the adoption of the open governance data models,

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and citizen participation in decision making as enshrined in the Constitution, it is certain that certain constraints that inhibit efficiency, remain (Open Government Partnership [OGP], 2020). These inefficiencies are to blame for 74,000 annual deaths that confront under-five children in the country (Dennis *et al.*, 2019). These deaths, although circumstantially linked to inefficiencies in the health sector, they are certainly preventable. Steps taken to reverse the trend need empirical calibration to increasingly or fully contain the current 362 deaths per 100,000 live births (Abuga, Kariuki, Kinyanjui, 2018).

The regular countrywide strikes of medics of the public hospitals, citing poor working conditions and the government's failure to address their grievances (Kithinji, 2019), augment inefficiencies. In addition, there is a dearth of empirical explorations into this important problem. Studies reviewed revealed multi-dimensional gaps that are contextual, methodological and conceptual in nature. Methodological gap has to do with the approach used by a study – data, data type and model. For instance, Kithinji (2019) used primary data. The present study used secondary data. Osakede (2020) used time series data while the present study will use panel data from 47 counties in Kenya. Tran and Vu (2018) conducted a similar study (as the present study) in Vietnam. Convincingly, no similar study had been done in Kenya with a particular focus to the counties. In addition, Muthui (2016) looked at factors influencing service delivery in Kitui County Government. The present study will include all the 47 counties in the country. Nderitu (2016) focused on determining the link between private hospitals' service quality and performance. The present study concentrated on examining the efficiency of County Government's expenditure on health in Kenya. The studies (Muthui 2016; Tran & Vu, 2018; Kithinji, 2019) present contextual gap that the present study endeavored to fill.

Factors that are taken into account, say, when making resource allocation decisions present a conceptual gap (Lane, 2018). Factors of consideration may take into account those that are considered by the Ministry of Health (MoH) to arrive at resource use allocation. Present study accounted for the efficiency of fund expenditure on health. This is because the literature reviewed could not be used to make meaningful conclusions on the efficiency of County Government's expenditure on health in Kenya. Thus, a knowledge gap exists that needs to be ascertained by examining the efficiency of County Government's expenditure on health in Kenya.

1.3 Research questions

i.   Do County Governments in Kenya spend their resources efficiently on health?

ii.   What are the factors that influence the efficiency of County Government's expenditure on health in Kenya?

iii.   What are the policy implications of the County Government's expenditure on health in Kenya?

1.4 Research objective

The overall objective of the study is to examine the efficiency of County Governments' expenditure on health in Kenya.

1.4.1 Specific Objectives

Specifically, the study is guided by the following set of objectives to:

i.   Examine the efficiency of County Government's expenditure on health in Kenya.

ii.   Establish the factors that influence the efficiency of county government's expenditure on health in Kenya

iv.   Draw policy implications of the County Government's expenditure on health in Kenya

1.5 Significance of the study

There is a dearth of literature on County Government's spending on health, under the devolved system. The findings will provide insights to enable decision making as pertains the County Governments in developing tested ways to enhance the efficiency of County Government's expenditure on health. Moreover, the study findings strengthen systematic and logical thinking among the decision-makers in the counties on techniques to increase the efficiency in spending the available revenue to improve the health of the community.

Ordinary citizens (who sit or are meant to sit in public participation forums) are the primary beneficiaries of the study findings. Thus, the findings of the study will contribute meaningful information to citizens on how they can directly (or indirectly) participate and get involved in the county affairs, thus enhancing the much-needed efficiency. The involvement of the community members on the activities of the county, mainly on matter health, is essential to ensure that the employees work towards public interest rather than self-interest. Therefore, the rationale of community participation in county affairs would be strengthened through this study. Lastly, the

findings add knowledge on the known about the efficiency of County Government's expenditure on health in Kenya.

1.6 Organization of the Study

Essentially, the research project paper is organized into chapters. In total there are five chapters. Consequently, the individual chapters are organized into sections and sub-sections. Chapter one contained the introduction within which the background, problem statement, research questions and objectives, alongside the significance of the study were presented. Chapter two provides the underlying theoretical and empirical literature in its first section and an overview of the same at the tail end. The next chapter details the research methodology to be adopted. In particular, the chapter will present theoretical and empirical models, data analysis, diagnostic tests and sources of data. Chapter four accounts for the results and their discussions. Lastly, chapter five details the results summary conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter comprised of four sub-sections with section 2.1 presenting introduction, 2.2 theoretical literature, 2.3 reviews empirical literature and overview of the literature is presented in section 2.4.

2.2 Theoretical Literature

The theoretical review included the Data Envelopment Analysis Approach, Allocation of resource theory and Agency Theory.

2.2.1 Data Envelopment Analysis Approach

As an approach, the Data Envelopment Analysis (DEA) has evolved, enduring the test of time. The approach was conceived by Charnes, Cooper and Rhodes (1978) who championed the idea that has since been advanced by proponents such as Charnes *et al.,* (1997). Fundamentally, DEA is a performance analysis technique that is used by organizations to measure the efficiencies of the DMUs. Under DEA, the DMUs are weighed to determine their level of efficiency, which is not only compared but gauged against the proportion of the total output that is produced and input that is consumed. This way, the level of efficiency (or lack of it) is determined using an index. Should the index be such that the total output that is produced supersedes the input that is consumed, it follows that the efficiency is high (Cooper, Seiford, & Zhu, 2011). The converse is also true.

The DEA analysis has some assumption such that it requires all elements infused in determination of the index to be explicit and non-negative. This is because efficiency under DEA lies between 0% and 100% (Charnes, Cooper, Lewin & Seiford, 1997). The efficient DMU is used as a reference benchmark for inefficient DMU. In the present study, the decision making units will be the counties in Kenya.

The Total output per the county was used as a proxy for health while the Total input was used as a proxy for the total expenditure on the health sector in the counties. Given that empirical studies advance adoption of the non-parametric DEA technique (*e.g.,* Afonso & Aubyn, 2006; Afonso &

Fernandes, 2008; Afonso & Kazemi, 2017; Cetin & Bahce, 2016; Cooper *et al.*, 2004; Gupta & Herhoeven, 2001), the technique was utilized in computing the efficiency of county government's expenditure on health in Kenya as shown in equation (i):

Efficiency (θ) $= \sum_{j=1}^{n} Yij / \sum_{j=1}^{n} Xrj$.. (i)

$\sum_{j=1}^{n} Yij$ *where* $i = 1, 2 \ldots . n$

$\sum_{j=1}^{n} Xrj$ *where* $r = 1, 2 \ldots \ldots s$

Where $j = 1, 2 \ldots . 47$

Where;

$\theta_{County1}$= Total output/Total input

$\theta_{County2}$= Total output/Total input

$\theta_{County3}$= Total output/Total input

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$\theta_{County47}$= Total output/Total input

Furthermore;

Total output ≥ 0

Total input ≥ 0

Total input (Expenditure on health per county)

Total output (Number of infant and under five deaths)

$\theta_{County1}$ is the efficiency of County 1

$\theta_{County2}$ is the efficiency of county 2

$\theta_{County3}$ is the efficiency of County 3

$\theta_{County47}$ is the efficiency of County 47

$1 \geq \theta_{47} \geq 0$

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The DEA model incorporates a set of parameters. Incorporation of the parameters under DEA is imperative for accuracy in level of technical efficiency. DEA makes it explicit to compute this efficiency, especially where and when uncertainties abound as far as allocation of prices to the parameters under study is concerned. In addition, utilization of the DEA model in the study is that it is possible to examine the sources of inefficiency and efficiency levels. By identifying the potential areas that are inefficient, individual counties experiencing technical inefficiencies can take stock and weigh options for improving efficiency, that way boosting performance. Through the medium and long-term adoption and diffusion of the DEA across counties, it can provide a reference point for health performance, allowing for peer-to-peer learning. Therefore, the model will be significant in examining the efficiency of county governments' expenditure on health in Kenya

However, the model had some limitations, despite the aforementioned merits. As Yang and Pollitt (2010) have established, it filters components under analysis to estimate technical efficiency vis-à-vis workable (non-price) interventions, within the sample under estimation. Comparison of scores between or among different studies is not feasible and only feasible, under special circumstances. This is plausibly, where there is a single health accounting entity and studies executed continuous, *ceteris paribus*. The plausible circumstance is, as Alirezaee and Khalili (2006) have observed, however, limited by virtue that variates under consideration must be extracts of a singular entity, national, county or otherwise. Also, another weakness of the theory is that DEA is more a non-statistical predictive model, which narrows practicality of statistical instruments, allowing for realization of an index that is critically sensitive to measurement error(s) (Sueyoshi & Goto, 2012). Cui and Li (2015) posit that variate variegation in term of substance have power to skew the index, dismantling the distribution of the frontier and reversing the health efficiency index in the national, county or other entities. The distribution of the frontier in DEA carries proportionate weight to the national, county or other entities under consideration unlike in regression and attendant modeling techniques, when the influence of outliers is non-accounted for. Given this verification, it is thus imperative scanning for possibility of outliers.

Notwithstanding the aforementioned shortcomings of the DEA, it is noteworthy that merits supersede the weaknesses (*see* Cetin & Bahce, 2016; Cooper *et al.*, 2004). Adoption of DEA was motivated by its utility elsewhere, as explained Muthui (2016), Tran and Vu (2018) and Kithinji, (2019) in the previous chapter. Convincingly, its adoption by the County Governments will

underscore need to estimate technical efficiency, providing empirical avenues for enhancement. Instrumentally, DEA has had ample utilization in estimation of technical efficiencies of government services. Selected variates are used as measures that can be developed to enhance efficiency. Therefore, the model will help the researcher to examine the efficiency of county governments' expenditure on health in Kenya.

2.2.2 Allocation of resource theory

The allocation of resource theory was advanced by Peteraf and Barney (2003). The theory explains 'efficient allocation of resources' as intentional production of goods and services to meet needs and wants while at the same time avoiding (or minimizing) wastage. More allocation of the resources needs to be channelled to the more efficient sectors (Liefner, 2003). Sectors producing maximum output with minimum inputs need to be allocated more resources. On the other hand, the sectors that are inefficient and production and input is almost the same need not to be allocated more resources. Allocation of more resources to the most efficient sectors will maximize the efficiency of the organization and enable it to gain a competitive advantage (Hartman & Boyd, 2008).

Besides, the theory establishes that the dynamic allocation of the funds enables institutions to plan and allocate sufficient time to the factors of production for the optimal output. Institutions continually develop mechanisms that help in allocating finance resources at its budget control system (Alvarez & Barney, 2005). The theory assumes that the optimal production of the output depends on the efficiency of the inputs and the extent on how the scarce resources are utilized. Thus, it is vital for the management of various sectors in an organization to develop ways to maximize the efficiency of the factors of production such as the introduction of the new technology, training of the employees among others. Counties in Kenya need to allocate the available resources more efficiently to enhance service delivery.

However, the theory is not without some weaknesses. One of the limitations of the theory is that the excess allocation of resources in one sector may make the other sectors worse off or underproduction (Setiawan, 2011). The challenges of over-allocation of the resources in one sector may make the company worse off when the demand for the goods or services produced in a particular sector of the business goes down unexpectedly. Another limitation of the allocation of resource theory is that the available resources in term of abundance are scanty, put into multiple

use, given the competing human wants that are difficult to satiate (Pardalos, Migdalas & Pitsoulis, 2008). This makes some of the counties in our case, to allocate resources in sectors that are not efficient due to the public demand.

The theory is still relevant to the current study despite its weaknesses. Liefner (2003) is emphatic that efficiency is a set of interventions whose sum total attenuates the sum total of inputs to inform the greatest extent of outputs. The total sum of inputs includes time and energy. Scarce resources can be utilized efficiently to achieve a higher output. The county executives can identify the most efficient sectors and use it as the benchmark for those sectors that are inefficient. Besides, those programs initiated by the county governments need to be guided by the strategic allocation of the available resources. Counties have limited resources and thus, efficient allocations will maximize the desired extent in outputs through improved health performance to the citizenry. Minimizing wastages requires the improvement of health, which in turn leads to low mortality rates. Therefore, the theory is relevant to the current study, particularly in informing the spending on health in Kenya. The efficiency to the counties can only be achieved through efficient spending of funds.

2.2.3 Agency Theory

The theory establishes that an agency relationship occurs where there are parties, agent and principle (Jensen & Meckling, 1976). Under this arrangement, the agent executes services as the dictums of the principal on behalf of some group of people (Safieddine, 2009). The arrangement is such that the agent devotes resources for the wellbeing of the group of people being represented. Given the level of trust that bestowed on the agent by the principle, it is expected and assumed by the principle that the agent will be prudent in making decisions. This trust, also, is the unseen asset that safeguards the interests of the Principal (Shi, Connelly & Hoskisson, 2017). The theory also reports that the actions of the agents of the organization need to be checked regularly to minimize the embezzlement of the funds and to maximize their self-interest on the expenses of the Principal.

Wagana and Iravo (2017) have amplified the applicability of the agency theory. They have consequently related it to a horizontally hierarchical model of the bottom-up and top-down type. For instance, if the top-down model were to be considered, then the County Government's decision makers would be the agents. This implies the decision makers are charged with responsibilities for higher authorities. In this case, the National Government would be the Principal. Similarly, if the bottom-up approach were to be considered, it follows that the Principal would be the people or the

citizenry or the service users. Verily, opinion leaders and/or elected leaders would be the agents. Consequently, the County Government decision makers are considered as agents for the opinion leaders and/or elected leaders and the citizenry. Given the model, *ceteris paribus*, a pure political environment would hierarchically have the citizens, users of government services as the principals (Kayode, Adagba & Anyio, 2013). Under the Principal – Agent theory, it is conclusive that the opinion and elected leaders are the agents in the sense that they are elevated by the citizenry who are the general public. This opinion and elected leaders, work in the best interest of the general public, thereof.

In Kenya's democratic model, electorates elect leaders (through the ballot) and elevate them to positions of authority where they can make or influence decisions and policies. The elected leaders are the people's representatives and work as agents for the general public who elected them to deepen shared prosperity. The county government officials are responsible for controlling and managing public finance well on behalf of the public.

However, scholars criticized the theory (*e.g.,* Davis, Donaldson, & Schoorman, 1997). In a more recent critique, Kayode *et al.,* (2013) have argued that the principal-agent theory is unilateral. As a result, it neither accounts for binding elements such as loyalty nor professionalism or even pride Moreover, the theory does not consider the opportunistic tendencies of principals. The rational nature of the principal and the agent, Kamara, Ofori-Owusu and Sesay (2012) posit, does not eliminate possibility for collusion between the principle and private agents, an argument that is consistent with Batley (2004) who has put forward that the theory only concentrate on the top-bottom; bottom-top association of players. This scenario provide basis for the critique of the theory that it cannot account for variant levels of decision makers.

Despite the critiques, the theory is relevant to the current study. The 2010 Constitution bestows power to the people. They are thus, appropriately, principals. The elected representatives are consequently agents, working to the dictums of the citizenry with loyalty, prudence and pride. According to Lafontaine (2002), there is need for intentional untwining of the principal-agent problem, something that is achievable through prudent use of resources. The agent framework has had applicability in matters good governance, accountability and responsibility by the agents to the best interest of the principal. Over the years the framework has influenced institutional arrangements and rearrangements, alignments and realignments for purposes of optimizing results

(Gailmard, 2012). Therefore, the agent theory is relevant in examining how the county government executives and governors intensify the efficiency of county government's expenditure on health.

2.3 Empirical Literature

Kithinji (2019) sought to examine factors determining the performance of primary health care facilities in Mombasa County. Specifically, the study determined how financing sources, prioritization in allocations and efficiency in spending influence performance using a cross-sectional design. A quota sampling technique to select respondents from 39 primary health care facilities in Mombasa County was also used. Primary data was used in the study. Upon analysis, it was established that financing sources, prioritization of resource allocations and efficiency in spending influence performance positively. The study concluded that sources of health financing, prioritization of allocations and efficiency in spending were significant predictors of performance of primary health care facilities in Mombasa County. It was recommended that the County government of Mombasa considers putting more emphasis on prioritizing funds allocated to primary healthcare facilities and also work on enhancing efficiency to improve performance. However, the study presents a methodological gap since the study used primary data, while the current study will use secondary data.

In examining the determinants of resource use and resource allocation, Asante and Zwi (2017) were particular about the aspects of equity and decision processing in the health system in Ghana. Data was collected and collated using semi-structured questionnaires. The targeted respondents included health managers at both levels of governance, County and National with representation from both regional and district levels alongside the development partners. Descriptive and inferential statistics were employed to estimate data. The results established that population size, poverty level, human resources and the infrastructural developments influence resource allocation decisions and equity. Most of the hospital with areas with high population and poverty level receive more allocations. The study concluded there is need for adoption of good governance and openness on how resources are assigned pegged on needs and wants, poverty level and population size. Nevertheless, the study presents a methodological gap because the study used primary data while the current study will use secondary data.

Lane, *et al.,* (2018) examined factors that MoH incorporates to determine how healthcare funds are shared in Victoria, Australia. The study relied upon the secondary data obtained from the

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Department of Health and Human Services. Similarly, descriptive and inferential statistics were used. It was gleaned through the analysis that an important factor that determines the allocation of the funds to the hospitals in the region included the population size and the income of the residents. However, the study presents a conceptual gap because the study mainly focused on factors that MoH incorporates in making determinations; the present study will look at the efficiency of County Governments' expenditure on health.

That the stepwise process of resource allocation the health sector in Baringo County is linked to equity is a hypothesis that Otieno (2016) sought to test. In-depth interviews of key officials in health and finance departments and Focused Group Discussion (FGD) for the health care providers were used. The target population included county/sub-county health department administrators, finance department administrators and health care providers. Data was collected using semi-structured interview questions, audio recorder and notes. Data was presented as tables, pie-charts, bar graphs and verbatim quotes. Using both qualitative and quantitative analytical approach, preliminary findings showed that the process of resource allocation to the health sector in Baringo was dependent of numerous factors such as population size and poverty level in the region. Nevertheless, the study presents a methodological gap because the study used primary data while the current will use secondary data.

Tran and Vu (2018) examined the determinants influencing financial performance and service delivery among the public hospitals in Vietnam. Data used was particularly fished from 43 public hospitals in the Northwestern part of the country. The DEA was used for purposes of analysis, which revealed that allocation of funds by the government enhances the performance and service delivery among the hospitals. Also, the study found that efficiency of staff working and financial management efficiency minimizes the cost of service delivery. The study concluded that the government of Vietnam needs to allocate enough finances to the hospitals for effective service delivery. However, the study was conducted in Vietnam, thus presents a contextual gap.

Across 25 selected private hospitals in Nairobi County, Nderitu (2016) associated performance and quality of service. Primary data collected among targeted respondents through semi-structured questionnaire was used. The results showed that sufficient allocation of funds towards improving the welfare of the employees working in the hospitals enhances the efficiency of the employees. The results also revealed service quality and the performance of private hospitals have a strong

positive and significant correlation. The study presents a conceptual gap given variates that were estimated. The current study will be focused on examining the efficiency of county governments' expenditure on health.

Understanding the trends in public health spending on health is important. In Ghana, Boachie and Ramu (2016) sought to understand this issue using infant mortality rate as a proxy for the output variate. A combination of the Ordinary Least Squares (OLS) and Newey-West regression approaches were used to determine the index of the input-output ratio of variates, as a percentage. Strikingly, it was established that public health spending alongside education increases, increase with increasing health, thereby, reducing infant mortality. It was recommended that the government need to institute measures that can improve the general performance of education, given its causal effect on the performance of health. The study presents a contextual gap because it was conducted in Ghana.

Throughout a 37 years' period of 1980 to 2017, Osakede (2020) analyzed the link between public health expenditure vis-à-vis public health outcome utilizing long-historical data in Nigeria. In understanding the relationship, the study focused on governance and quality of health offered and the underlying association between the two components. Upon executing the Hausman statistical tests to determine the presence or absence of endogeneity, the two-stage least square regression model was used for estimation. Accounting for the confounding role of good governance on the effectiveness of public health expenditure, it was gleaned through the findings that expenditure on health was insignificant in a general model but turned significant when good governance was interacted. When more interactions were executed, it was found that government health expenditure and control of corruption yielded positive results; when interacted with the rule of law, maternal mortality increased. Noteworthy, public health expenditure interacted with regulatory environment increased life expectancy; an inverse outcome was realized when political climate was interacted leading to decrease in life expectancy, compounded with poor maternal and infant health outcomes. Considering that the present utilized panel data, the study presents a methodological gap as it used time series data.

In Kenya, Muthui (2016) assessed drivers of service delivery across counties, with special reference to Kitui County Government. Specifically, targeting respondents in Matinyani ward within the County, a simple random sampling approach was utilized to determine the requisite

sample. Quantitative data was then collected using a questionnaire and measured using descriptive and inferential techniques. The study findings revealed that Kitui County Government (KCG) endeavored to ensure equity in sharing of available resources to meet citizens' competing needs and wants. The dual components of resource mobilization, public participation as per the legislations and good governance were requisite for service delivery. The study recommends the County to expand budgetary provision to respond to the electorates' needs beyond basic needs and infrastructure. Nonetheless, the study presents a contextual gap because the study looked at factors influencing service delivery in Kitui County Government, while the current study will include all the 47 counties.

2.4 Overview of Literature

Reviewing studies from different contexts is essential for making comparisons and having a comprehensive understanding of the verdicts of other scholars. Although a range of studies were reviewed, broad overview of the efficiency of County Governments' expenditure on health in Kenya could be limited. The findings of the studies reviewed were dissimilar. The results of the reviewed studies present the knowledge gap: contextual, methodological and conceptual gap. For instance, Kithinji (2019) presents a methodological gap since the study used primary data while the current study will use secondary data. Also, Otieno (2016) presents a methodological gap because the study used primary data. The shortcoming of the primary data is the possibility of the biasness. Therefore, the conclusion of the study based on a primary data may not be much reliable for the policy formulation. In addition, Osakede (2020) presents a methodological gap because the study used time series data while the current study will use panel data from 47 counties. The limitations of the time series analysis are only one firm that is under observation while in the panel, numerous firms are included. This enables the researcher to use the information from various firms instead of generalization other firms based on the findings from one firm. The operations between firms differ and conducting a study from one and generalizing for the others is not satisfactory.

Furthermore, Tran and Vu (2018) present a contextual gap because the study was conducted in Vietnam. Likewsie, Boachie and Ramu (2016) present a contextual gap because the study was conducted in Ghana. Further, Muthui (2016) presents a contextual gap because the study looked at factors influencing service delivery in Kitui County Government only while the current study will include all the 47 counties. Similarly, Nderitu (2016) presents a conceptual gap given that the

study linked performance and the quality of healthcare services in private hospitals; the present study focuses on examining the efficiency of county governments' expenditure on health.

Lane *et al.,* (2018) present a conceptual gap. Given these studies, it can be generalized that the efficiency of county governments' expenditure on health in Kenya remains an issue for further empirical investigation. Therefore, the literature reviewed cannot be used to make deductions about the efficiency of county governments' expenditure on health in Kenya. Thus, a knowledge gap exists, and this forms the rationale of conducting the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Chapter three places particular focus to the methodology and is organized into five sub-sections. Section 3.1 shows the introduction, section 3.2 theoretical model, Section 3.3 empirical model, Section 3.4 data analysis and section 3.5 presents the data type and source.

3.2 Theoretical Model

The theoretical model of the study is anchored on the DEA approach. As espoused under literature, the counties will be the DMUs. All the 47 counties will be used in the study to examine their efficiency on expenditure to health. The most efficient county in health (low mortality rates) is expected to be used as the benchmark by other counties; particularly inefficient ones (have high mortality). Thus, the DEA approach is presented below.

Efficiency $(\theta) = \sum_{j=1}^{n} Yij / \sum_{j=1}^{n} Xrj$ ....(ii)

$\sum_{j=1}^{n} Yij$ $where$ i $= 1, 2 ..... n$

$\sum_{j=1}^{n} Xrj$ $where$ r $= 1, 2 ...... s$

$Where$ j $= 1, 2 .....47$

Where;

$1 \geq \theta \geq 0$ (That is efficiency ranges between 0% and 100%)

r= Inputs in the county government (Expenditure on health)

i= Outputs in the counties (Number of infant and under five deaths)

j=number of counties

Therefore, the Counties' efficiency in determining the health (mortality of the infants and under-five mortality) will be determined by summing up the mortality rate divided by the total expenditure on health. The choice of the infant and under-five mortality rates as proxies for health

is anchored on literature and consistent with Otieno (2016), Lane *et al.*, (2018), and Oloo *et al.*, 2017).

3.3 Empirical model

The study derived the empirical model from the Data Envelopment Analysis approach. The study presented the methodology that sought to explain how the DEA approach determined efficiency. The study estimated the following model, as shown in the equation (iii) below

$$\text{Efficiency } (\theta_1) = \sum_{j=1}^{n} \text{Heath} / \sum_{j=1}^{n} \text{Expenditure} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(iii)}$$

In addition, there are other factors that are expected to influence the efficiency of expenditure on health such as population size and county grants, Thus, the equation after factoring other factors that has the possibility of influencing efficiency in county government expenditure will be;

$$\sum_{j=1}^{n} \text{Heath} / \sum_{j=1}^{n} \text{Expenditure} + Population + County\ grants + \varepsilon \dots\dots\dots\dots\dots\text{(iv)}$$

Where;

Population is the total population per county

County grants is the financial aid given to each county to fund health from donors and any other stakeholders

ε is the Error term (This error term presents other factors that influence efficiency other than population and County grants)

Table 3.1: Summary of the Variables

Variable Name	Type of Variable	Measurement	Source of data
Efficiency	Dependent	Total number of infant and under five deaths divided by the expenditure on health	Counties, Commission on Revenue Allocation and the ministry of finance
Population	Independent	Total Population per County	KNBS/ Counties
County grants on health	Independent	Financial aid advanced to each county to fund health	KNBS/ Counties

3.4 Data Analysis

Data was analyzed using descriptive and inferential statistics. The descriptive statistics included mean, standard deviation, and minimum, maximum while the inferential statistics entail the panel regression model. The researcher relied on the data from the counties, the Commission on Revenue Allocation and the ministry of finance and KNBS from 2015 to 2019. The justification for choosing between 2015 and 2019 was that during this period, the counties were fully operational, and most functions had been delegated to the counties from the national government.

3.5 Data Type and Source

Panel data over the period 2015 to 2019 was used in the study. The data was preferred because it would reveal the efficiencies of the counties for a specified period. The data was compiled from the counties, the Commission on Revenue Allocation and the Ministry of Finance (MoF) and KNBS. The choice of data and period was motivated by the fact that during this period, the counties were fully operational, and most functions had been delegated to the counties from the national government. The use of panel data was to control for heterogeneity among the cross-sections arising from the inherent varying nature of their characteristics. Additionally, it discounted for time effects, which may have occurred due to changes in policy and macroeconomic environment.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The section includes the presentation of the descriptive statistics and empirical results. Each of the sections is comprehensively presented based on the study findings.

4.2 Descriptive statistics

The descriptive statistics presents the general description of the data. The results presented in Table 4.2 describe the variables in terms of minimum, maximum, mean and standard deviation.

Table 4.1: Descriptive statistics

Variable	Observation	Minimum	Maximum	Mean	Std. Deviation
Population size	94	101539	4397073	919535	612384.5
Ln health (under five mortality)	235	1.3986	2.0516	1.6694	0.1295
Ln grant	235	6.9980	8.2160	7.6967	0.2272

The descriptive statistics presented in Table 4.1 show the minimum population in a county is 101 539 people with a maximum of 4,397,073 people. The majority of the counties have a Population size of around 919535 people. It can be reported that the natural logarithms of under-five mortality and grants are not much dispersed significantly from the mean values. The minimum value of ln health (under-five mortality) is 1.3986, with a maximum of 2.0516 and a mean of 1.6694. Furthermore, the mean of ln grant was 7.6967 with a minimum of 6.9980 and a maximum of 8.2160.

4.3 Empirical result

The study sought to examine the output-oriented efficiency scores with constant returns to scale for 47 counties between 2015 and 2019. The study included the 47 counties to have adequate comparisons of the efficiency in healthcare delivery. The study looked upon establishing the

efficiency across the periods 2015-2019 and their relative efficiency in terms of the output variable (reducing child mortality). The study results are summarized in Table 4.2

Table 4.2: Constant Returns to Scale (CCR) Efficiency Scores (2015-2019) output oriented

Country	2015	2016	2017	2018	2019	Average	Rank
Baringo	0.9130	0.6624	0.5405	0.5890	0.7504	0.6911	18
Bomet	0.5955	0.6643	0.6782	0.6004	0.6912	0.6459	25
Bungoma	0.6307	0.6843	0.6468	0.7138	0.7417	0.6835	19
Busia	0.5682	0.6955	0.5133	0.4895	0.5179	0.5569	37
Elgeyo/Marakwet	0.7199	0.8561	0.7635	0.7106	0.8022	0.7705	5
Embu	0.8888	0.5312	0.9321	0.5051	0.9302	0.7575	7
Garisa	0.4895	0.7930	0.4905	0.7390	0.6739	0.6372	27
Homa Bay	0.4650	0.4848	0.4362	0.5421	0.5227	0.4902	41
Isiolo	0.8839	0.7102	0.7233	0.7490	0.6484	0.7430	10
Kajiado	0.4866	0.6010	0.6727	0.4862	0.6188	0.5731	36
Kakamega	0.4834	0.5311	0.7504	0.6677	0.8394	0.6544	23
Kericho	0.7138	0.5320	0.7250	0.6427	0.6264	0.6480	24
Kiambu	0.6486	0.7239	0.6291	0.6050	0.6714	0.6556	22
Kilifi	0.4810	0.4910	0.4183	0.5274	0.4878	0.4811	43
Kirinyaga	0.6085	0.6624	0.5405	0.5766	0.5257	0.5827	34
Kisii	0.6458	0.6826	0.7343	0.7240	0.8196	0.7213	13
Kisumu	0.7883	0.7469	0.7540	0.7542	0.7144	0.7516	9
Kitui	0.4794	0.5786	0.6040	0.7109	0.6489	0.6044	33
Kwale	0.4687	0.6385	0.6875	0.6320	0.4789	0.5811	35
Laikipia	0.5040	0.5885	0.4141	0.3014	0.4144	0.4445	46
Lamu	0.8951	0.7907	0.9694	0.7490	0.7489	0.8306	4
Machakos	0.5870	0.5462	0.6937	0.6297	0.6407	0.6195	31
Makueni	0.7630	0.7432	0.7459	0.7589	0.7559	0.7534	8
Mandera	0.7499	0.8231	0.6104	0.8072	0.6677	0.7317	12
Marsabit	0.6590	0.8349	0.6092	0.5051	0.5304	0.6277	30
Meru	0.6285	0.6127	0.6872	0.6724	0.6250	0.6452	26
Migori	0.5311	0.5527	0.6355	0.7042	0.7175	0.6282	29

Mombasa	0.6413	0.6416	0.4509	0.6454	0.6956	0.6150	32
Murang'a	0.8540	0.9066	0.8031	0.8853	0.8912	0.8680	2
Nairobi	0.6262	0.6937	0.6884	0.6907	0.6670	0.6732	20
Nakuru	0.8087	0.8806	0.9838	0.7495	0.9101	0.8665	3
Nandi	0.4001	0.4550	0.4757	0.4894	0.5643	0.4769	44
Narok	0.6376	0.6939	0.5489	0.5389	0.7389	0.6316	28
Nyamira	0.7379	0.4894	0.8490	0.8399	0.7934	0.7419	11
Nyandarua	0.7420	0.8940	0.4684	0.6930	0.6894	0.6974	16
Nyeri	0.8535	0.7391	0.5314	0.6787	0.6556	0.6917	17
Samburu	0.9687	0.8096	0.6891	0.4426	0.6396	0.7099	15
Siaya	0.6749	0.7049	0.6437	0.6012	0.7082	0.6666	21
Taita Taveta	0.6580	0.7298	0.7284	0.6918	0.7539	0.7124	14
Tana River	0.5791	0.3801	0.3714	0.4400	0.5005	0.4542	45
Tharaka-Nithi	0.6878	0.5763	0.5063	0.4664	0.4690	0.5412	40
Trans-Nzoia	0.4474	0.4399	0.4674	0.3630	0.3925	0.4220	47
Turkana	0.6906	0.7319	0.8147	0.7723	0.8191	0.7657	6
Uasin Gishu	0.6598	0.7817	0.4495	0.4495	0.4415	0.5564	38
Vihiga	0.7856	0.9518	0.9732	0.8689	0.8658	0.8891	1
Wajir	0.4800	0.5017	0.4152	0.5399	0.5104	0.4894	42
West Pokot	0.6090	0.5600	0.5363	0.4861	0.5702	0.5523	39
Average	**0.6557**	**0.6665**	**0.6383**	**0.6261**	**0.6614**	**0.6496**	

Based on the results presented in Table 4.2, the average efficiency score on County governments' expenditure on health by the 47 county governments between 2015 and 2019 was found to be 64.96%. This implied that most of the county governments in Kenya scored an efficiency of 64.96% on expenditure on health between 2015 and 2019. The average efficiency of the counties in 2015 was 65.57%, 66.65% in 2016, 63.83% in 2017, 62.61% in 2018 and 66.14% in 2019. The most efficient year of county governments' expenditure on health was 2016. Four Counties, namely Vihiga, Muranga, Nakuru and Lamu, have an efficiency score of above 80% with 88. 91%, 86.80%, 86.65% and 83.06%, respectively, but did not operate on the frontier. The most efficient county on expenditure on health was Vihiga County, with an average of 88.91% between 2015 and 2019. This county can be used as the benchmark by other counties, particularly inefficient ones. It was found that some counties (Homa Bay, Kilifi, Laikipia, Nandi, Tana River, Trans-

Nzoia and Wajir) have an average efficiency of less than 50% between 2015 and 2019. The efficiencies score by these counties was 49.02%, 48.11%, 44.45%, 47.69%, 45.42%, 42.20% and 48.94% respectively. This demonstrates the expenditure on health among the seven counties (Homa Bay, Kilifi, Laikipia, Nandi, Tana River, Trans-Nzoia and Wajir) have an average score of more than 50% technical inefficiency. It was found that none of the 47 counties in Kenya is optimal on expenditure on health in Kenya.

4.4 Determinants of Efficiency

The study also sought to examine factors that influence the county government's expenditure on health in Kenya. The study employed the Tobit analysis to analyze these factors. The study findings are presented in Table 4.3

Table 4.3: Determinants of Efficiency

Variables	Efficiency
Ln (Grant)	0.0215
	(0.0174)
Ln (Population size)	-0.0148
	(0.0373)
Constant	1.589***
	(0.325)
Observations	235
R-squared	0.07

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The study examined the factors that influence the efficiency of county governments 'expenditure on health in Kenya. The efficiency (dependent variable) was measured by the under-five mortality. The factors that were considered to be effective in determining efficiency included grants and population size. The results presented in Table 4.3 indicate the coefficient of determination (R squared) obtained was 0.07. This indicated that grants and population explain 7% of the efficiency on the county governments' expenditure. Further, it was found that grants are positively and significantly related to efficiency (β=.0215, p=.0174). The results implied that a unit increase in the grants would lead to an increase in efficiency level by 0. 0215 units when other factors are held constant. Moreover, the study found that population size is negatively and significantly related to the efficiency (β=-.0148, p=.0373). The results signified that a unit increase in the population size would decrease efficiency by 0.0148 units when other factors are held unchanged.

The results concur with the findings of Kithinji (2019), who revealed that sources of health financing, prioritization of allocations and efficiency in spending were significant predictors of the performance of primary health care facilities. Moreover Lane *et al.,* (2018) revealed that factors that determine the allocation of the funds to the hospitals in the region include the population size and the residents' income. Tran and Vu (2018) showed the allocation of the fund by the government enhances the performance and service delivery among the hospitals. Further, Nderitu (2016) found sufficient allocation of funds towards improving the welfare of the employees working in the hospitals enhances the efficiency of the employees. Muthui (2016) unveiled that resource mobilization, public participation and accountability are the primary factors that influence service delivery in County Governments in Kenya. Otieno (2016) reported that the process of resource allocation to the health sector in Baringo was dependent of numerous factors such as population size and poverty level in the region.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter presents the summary of the findings, conclusion and recommendations. Each section is comprehensively detailed.

5.2 Summary of Findings

The study examined the efficiency of the county government's expenditure on health in Kenya between 2015 and 2019. The study found the average efficiency score on county government's expenditure on health by the 47 county governments between 2015 and 2019 was 64.96%. The average efficiency score in 2015 was 65.57%, 66.65% in 2016, 63.83% in 2017, 62.61% in 2018 and 66.14% in 2019. The study found that Vihiga, Muranga, Nakuru and Lamu counties have an efficiency score of above 80% with 88. 91%, 86.80%, 86.65% and 83.06% respectively. The study further found counties such as HomaBay, Kilifi, Laikipia, Nandi, Tana River, Trans-Nzoia and Wajir have an average efficiency of less than 50% between 2015 and 2019 with 49.02%, 48.11%, 44.45%, 47.69%, 45.42%, 42.20% and 48.94% respectively. The study found that none of the 47 counties in Kenya is optimal on expenditure on health. The study found that grants and population size influence the county government's expenditure on health. It was found that grants and population explain 7% of the county governments' expenditure efficiency. The study established that grants are positively and significantly related to efficiency (β=.0215, p=.0174). The population size was negatively and significantly related to the efficiency (β=-.0148, p=.0373).

5.3 Conclusions

It is concluded that counties in Kenya are not much efficient in expenditure on health. The study found average efficiency of the counties between 2015 and 2019 was 64.96%. The average efficiency score for the 47 counties for the period 2015-2019 demonstrates the county government are not much efficient and therefore can realize optimal output level by employing the same level of county expenditure on health. The grants and population size are significant in influencing the county governments 'expenditure efficiency. The more the grants, the higher the efficiency, while the higher the population size, the lower the efficiency. The most efficient county on expenditure on health is Vihiga County, with an average of 88.91% between 2015 and 2019 and thus can be

used as the benchmark by other counties, particularly inefficient ones. The most inefficient counties (Homa Bay, Kilifi, Laikipia, Nandi, Tana River, Trans-Nzoia and Wajir) with less than 50% efficiency can employ the same resources to achieve technical efficiency.

5.4 Recommendations

Based on the study findings, it is recommended that county governments look at strategies that will increase the grants. The grants were found to be positively and significantly related to efficiency on county expenditure on health. The study also recommends that the counties can sensitize the community on how to reduce the population size. The population size was found to be negatively related to efficiency. The higher population size might hinder the service delivery, thus lower the efficiency. It is also recommended that the national government ensure no health budget is diverted to other sectors if the allocation was meant to be used in the health sector. The study recommends more audits should be conducted within the counties to minimize the embezzlement of funds. The study also recommends that financial advisory on the utilization of the revenues collected and the county government expenditures on matters to do with health. Finally, the study recommends that more studies be conducted to examine factors that influence county governments' expenditure efficiency other than population size and grants. This will be key to have numerous constituents that will enhance county governments' expenditure efficiency on health.

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Appendix I: Data Collection Sheet

	Year	County	Efficiency Under five mortality (death per 1000 lives)	Population size (Total Population size)	County Grant (Financial aid advanced to each county to fund health
1	2015	1			
2	2016	1			
3	2017	1			
4	2018	1			
5	2019	1			
6	2015	2			
7	2016	2			
8	2017	2			
9	2018	2			
10	2019	2			
11	2015	3			
12	2016	3			
13	2017	3			
14	2018	3			
15	2019	3			
16	2015	4			
17	2016	4			
18	2017	4			
19	2018	4			
20	2019	4			
.	.				
.	.				
.	.				
235	2019	47			

Appendix II: Estimated Research Budget

Item/Activity	Estimated Cost (Kshs)
Stationery	7,500
Printing/Photocopying	13,000
Hiring of research assistant	20,000
Analysis	38,000
Miscellaneous	18,000
Total cost	**96, 500**