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# Efficiency and Organizational Arrangements in the Utilization of Resources at Primary Health Care (PHC) in Machakos County, Kenya

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**Abstract:** Health care is costly and there is need for rational use of health care resources for the world to achieve universal health coverage (UHC). The preventive Primary Health Care (PHC) service is cheaper than the Secondary Health Care (SHC). PHC is strengthened through gatekeeper system, so the emphasis on the PHC for cost control is self-explanatory. This study aimed at determining the efficiency and organizational arrangements using human resources for health (HRH), laboratory services and supply of drugs as the performance indicators that determined rational use of resources in Machakos County, Kenya. This was a convergent parallel mixed methods cross-sectional study that employed qualitative and quantitative data collection techniques. The study targeted facility health managers in charges and policy implementers namely the Chief Officer of health, the Director of Prevention and PHC and the Medical Superintendents and patients seeking health care. A response rate of 83%was achieved (n=83), of whom 84.3% were nurses and 15.7% diploma medicine practitioners. Over (70%) of the health facilities had less than 3professional health workers. Exactly 75% of the community-based self-referrals cases would be treated at PHC level. Self referrals were largely due to patients' perceived need for laboratory services (53.8%) and medicines (60%). On the contrary, 89.6% of the residents of Machakos County, Kenya were informed about PHC services, 91.7% were accessible to PHC and 93.7% had faith in health care providers at PHC level. The HRH, diagnostic equipment and essential drugs were not the main reasons for self-referrals, but perceived needs for drugs and laboratory services. The inverse and disproportionate attendances of patients at both PHC and SHC levels caused dissonance in service delivery and subsequent inefficiency in service delivery in Machakos County, Kenya. Proper supervision and implementation of referral policy available at county level should be emphasized.

**Keywords:** Efficiency, Primary Care, Organizational, Arrangements

## 1. Background

Health care services provision is expensive and the need for rationalization of resources utilization is crucial if the World must reach universal health coverage [1]. Health care is not free, hence, there is need to limit its use [2]. The PHC is less expensive than secondary care if strengthened through effective gatekeeper system; hence the emphasis on PHC for cost-effective use of resources is understandable [3]. The foremost characteristic feature of the PHC services is that patients do not visit hospitals without a recommendation from their PHC service providers. Since hospitals are the greatest users of investigations and procedures and since such interventions have a finite risk of iatrogenic complications, the intervening factor of PHC is protective for patients in reducing both unnecessary invasive investigations and drug adverse events [4].

Accountability in the healthcare is a requirement for PHC clinicians and the systems within which they operate [5].

Clinicians and health institutions are answerable to their patients and communities for addressing their health needs through a partnership with a patient in the context of family and community for quality of care, patient satisfaction, efficient use of resources and ethical behavior [6]. These responsibilities of health workers can only be performed if drugs, consumables, investigations, infrastructures and health personnel are made available and managed efficiently [7]. A performing health system needs the following building blocks to function properly and efficiently; health services delivery, competent and professional health workforce, functioning health management information system (HMIS), essential medical products and technologies, health financing, leadership and governance and the recommendations of the World health Organization (WHO) for the requisite health infrastructures [8].

Qualified and motivated Human Resources for Health (HRH) are essential for adequate health services delivery and almost half of the world total health budget goes to human resources for health [9]. The world is facing shortage of HRH, exacerbated by massive migration from developing to developed countries and from rural to urban areas [10]. The migration of human resources for health, inadequacy of medical education for health services providers, urban-rural inequality, brain drain from the public to the less affordable private sector and lack of incentives are key factors to these gaps [11]. The WHO has advocated for a qualified and motivated health work force for overcoming challenges to achieve the UHC [12]. It also stresses that the quality of health services, efficacy, efficiency, accessibility and effectiveness depends primarily on the performance of those who deliver them [13]. The WHO report proposes a human resource for health ratio of 25 per 10,000 populations to guarantee the advisable minimum level of coverage with the basic public health interventions [14]. This suggests that in countries with fewer than 2.5 health professionals per 1,000 populations, it is impossible to increase to 80% the proportion of women attended to at childbirth by skilled and professional health personnel or measles immunization coverage therefore the need to manage efficiently human resources for health is key and justifiable [15].

Pharmaceutical products are important health care inputs in the PHC system worldwide; it is estimated that over half of all prescribed medicines are sold inappropriately [16]. A key function of any health care system is to deliver appropriate medicines and health services in an equitable, quality, responsive, reliable and efficient manner [17]. The quality of PHC is assessed by patients on the basis of appropriate health care provision and availability of essential medicines [18]. Essential medicines are supposed to be available in adequate amounts, easy accessibility, appropriate dosages and good quality at an affordable price [19]. The PHC prevents the root causes of illnesses and better use of existing health interventions and it can prevent 70% of the global burden of disease [20].

A high number of unnecessary laboratory analyses performed at hospital level have an impact on the management of resources [21]. Bypassing the PHC health facilities, the patients become exposed to high costs of hospital reagents and supplies and there is a daily increase in material costs by 15% from the PHC [22]. Doctors often require extensive laboratory services to confirm their diagnosis and support their clinical acumen and yet the medical equipment is limited to the most available tests [23]. For laboratory services, a good selection and interpretation of results, with a range of other factors and a rational approach can be continuously used in disease prevention, diagnosis and treatment [24]. These analyses are indicators that it is economically unjustified to routinely request for all available investigations [25]. There is a need to establish criteria for a rational laboratory request with clear guidelines [26]. The result of an analysis indicates that if one invests in preventive health care, he/she will later be saving on the costs of treatment of diseases. Rationalization of laboratory investigations sounds to be one the strategies to control the unnecessary use of hospital resources [27].

To succeed, PHC needs to be driven by competence, professionalism, ethics, quality, effectiveness, efficiency and cost-benefit that are used in the model of health care delivery aiming at rationalizing use of scarce resources for healthcare [28]. Devolved health care system in Kenya is still immature, therefore it needs experience, more research, benchmarking and innovative measures to strengthen primary health care and deliver affordable and quality health services [29]. This study did not focus on evaluating efficiency using input and output indicators but aimed at reviewing efficiency and organizational arrangements that determine rational use of resources at the County level of Machakos, Kenya. It identified three (3) core and relevant domains that highly influence efficiency in health systems namely human resources for health, drugs, consumables and laboratory equipment at PHC level. This study does not focus on evaluating efficiency.

## 2. Methodology

This was a convergent, parallel and mixed method descriptive cross sectional study design that employed multi-methods and techniques in data collection [30]. This study was conducted with approval of the Kenya Methodist University Ethical and research Committee (ERC) over a 3-month period from January to March 2015 among the public health facilities in Machakos County, Kenya. The study was non-invasive with the population comprising of managers (gatekeepers) of Health Centres and dispensaries (gatekeepers) at Tier 2 (PHC) and patient services at Tier 3 (Hospitals). Key informant interviews (KIIs) on the policy custodians at the County level, among them, the Chief Officer of health, the Director of Preventive and PHC services and the Medical Superintendent of the secondary level health facilities (regional referral hospitals) were interviewed. The County Government of Machakos, with a total population of 150,041 (0.33% of Kenya's population) had 99 dispensaries, 22 health centers and 4 sub-county

hospitals at Tier 3 and one Tier 4 county referral and teaching hospital. Therefore, there were121 primary health care (PHC) managers presiding over the management of dispensaries and health centers. Using the Taro Yamane formula (1967), a minimum study sample size was calculated at 93 health managers and rounded off to 100 to cater for a possible 5% non-response. A maximum of 12 and a minimum of 8 patients constituted a focus group for discussion (FGD) [31]. For each hospital, 2 FGDs among patients and their care takers (by gender and age) were conducted. The FGDs were conducted using the standard guidelines by administration of questions by the researcher and a competently trained assistant recording the proceedings of the FGD and responses recorded on audio equipment to facilitate replay thereafter. Primary data was captured by administration of key informant interviews (KIIs). The researcher administered open-ended questions to the KIIs. Responses from the KIIs were instantly captured in notebooks. At each sub-county hospital, two FGDs were conducted, among patients and their caretakers. All the study participants who were informed and had voluntarily signed their consent forms participated in this study and all adult participants aged 18-65 years and emancipated children responded to the questions. The emancipated children (caretakers) aged 15 years and above and fully responsible for the patients they accompanied to the health facilities, qualified to participate in this study. All qualified and informed persons who had not voluntarily signed the consent forms; children below 15 years of age and adults above 65 years of age were excluded from this study. The study excluded the physically ill and mentally incapable patients for purposes of data validity and integrity. Other exclusions were patients brought in as emergency cases, the sick and the critically ill. Quantitative data was double entered using Epi data to minimize errors and exported to the Statistical Package for Social Science (SPSS) version 20.0 software for analysis. Data analysis involved mainly descriptive statistics while qualitative data was transferred to Atlas. ti 7 software for analysis. Different and mixed methods and techniques were used in the development and management of data (triangulation) to enhance data accuracy, dependability, repeatability, replicability and generalizability. Data display was organized and summarized in tables, graphs and summary measures. Correlation was done using Chi-square test and significance was set at <0.05.

# 3. Findings and Discussion

### *3.1. Socio-demographic Characteristics (n=83)*

Out of the 100 questionnaires administered to the study participants, 83 responses were received, giving a response rate of 83%. Of the 83 valid responses, a large majority (84.3%) of them were nurses and 15.7% were diploma certificate holders in clinical medicine holders (clinical officers). This paramedical staff deployment pattern was in tandem with known proportion of nurses to clinical officers in the Kenyan health sector. The results were also a true reflection of the dominance of the nursing cadres as health managers at the PHC facilities in Kenya. This study used a statistical test (Chi-square) at 95% confidence interval with a 5% margin of error. The variables were statistically significant at p-value of <0.05.

Though there were more female (59%) health managers than males (41%), the gender difference between males and females was not statistically significant (p<0.124) weighted on gate keeping. A predominantly young and energetic aged 26-45 years significantly (p<0.01) dominated (73.5%) the PHC managers in Machakos County, Kenya, as opposed to youthfulness and inexperience (7.2%) below 25 years of age and maturity and experience (19.3%), above 46 years of age. This implies that the Tier 2 level of health care in Machakos County needs experience to boost the institutional memory continuity and to mentor the youthful employees. Though mostly young, the management of PHC system was by and large (p<0.001) in the hands of the married (80.7%) PHC managers compared to the single (19.3%) (Table1).

***Table 1.*** *Socio-demographic characteristics (n=83).*

| Characteristics | Categories | Frequency | % | P-value |
|---|---|---|---|---|
| Designation of the health worker | Nurse | 70 | 84.3 | <0. 001 |
| | Clinical officer | 13 | 15.7 | |
| Gender | Female | 49 | 59.0 | 0.124 |
| | Male | 34 | 41.0 | |
| Age | 18-25 | 6 | 7.2 | <0.001 |
| | 26-35 | 33 | 39.8 | |
| | 36-45 | 28 | 33.7 | |
| | 46 + | 16 | 19.3 | |
| Marital status | Married | 67 | 80.7 | <0.001 |
| | Single | 16 | 19.3 | |

### *3.2. Organizational Arrangements*

#### *3.2.1. Human Resources: Number of Health Personnel Per Facility*

The majority (70.5%) of the health facilities had between one and three health workers and 92.6% had up to 5 health workers. The average was found to be two health workers per primary health care facility (Figure 1).

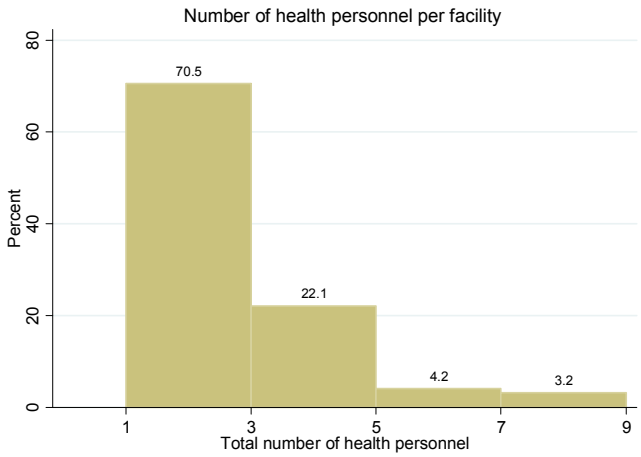


***Figure 1.*** *Number of Health Personnel per Tier 2 Health Facility (n=83).*

Health workers are the key players in a health care system and this can make good or bad impact in health care service delivery. The World Health Organization recommends that a health worker attends between 20-25 patients per day. This study found out that each PHC health facility in Machakos County was allocated 2 nurses, hence in practical terms, at least one health worker would always be available on duty.

### *3.2.2. Reasons for Use of PHC Health Care Facilities*

***Table 2.*** *Reasons for self-referrals to SHC facilities (n=83).*

| Reasons for seeking PHC services | Respondents (%) |
|---|---|
| Availability of laboratory facilities | 43.7 |
| Personal preference for SHC services | 38.6 |
| Availability of drugs | 15.4 |
| Awareness about PHC services | 89.6 |
| Access to PHC centres | 91.7 |
| Faith in PHC healthcare providers | 93.7 |

The leading reason (56.3%) for self-referrals from the community to hospitals (secondary health facilities) in Machakos County were low level of access to laboratory services followed by personal preference (43.7%). Inaccessibility to laboratory services and lack of drugs accounted for approximately 60.5% of all self-referrals directly to secondary health facilities (SHCs). Contrary to the general belief, a large proportion (89.6%) of the residents of Machakos County were informed about available and quality of health services provided. These findings also confirmed that the residents of Machakos County were highly accessible (91.7%) to points of health services delivery and they had high confidence (93.7%) in the County's health work force. The other reasons advanced by patients during FGDs for by passing PHC centres in Machakos in preference for hospitals in seeking preventable health care included long waiting time, some corruption among some health workers and in a few PHC centres being accredited by the National Health Insurance Fund (NHIF) insurance which did not cover the PHC services in Kenya.

### *3.2.3. Workload at Tier 3 and Efficient Use of Resources*

Most of the PHC morbidities in Machakos County, Kenya, in the year 2014 were preventable, yet patients with preventable diseases preferred bypassing their PHC centres and seeking health care at hospitals. Various respiratory tract infections accounted for the largest (53.8%) of all the PHC morbidities in Machakos County, Kenya in the year 2014. The respiratory tract infections in the upper and lower respiratory systems referred to in this study included allergic cough, bronchitis, community acquired and atypical pneumonia, asthma and pulmonary tuberculosis among others. The respiratory tract infections were followed by skin diseases at 11.6%, diarrheal diseases (6.3%), urinary tract infections at 4.9% and accidents accounted for 4%. These findings implied that approximately 75.7% of the morbidities in Machakos County could be effectively handled at the PHC level, of which 66.8% did not require laboratory investigations hence appropriate to be managed at the PHC levels in the county.

In their responses, the health managers concurred that the majority of self-referrals from the community to hospitals, thereby bypassing the PHC centres were preventable medical conditions that nurses could handle at the PHC level. More than 75% of diseases treated at sub-county hospitals could be treated at PHC facilities in Machakos County. The 2014 morbidity returns also showed that morbidities were primarily preventable and manageable at the PHC centres in Machakos County (Figure2).

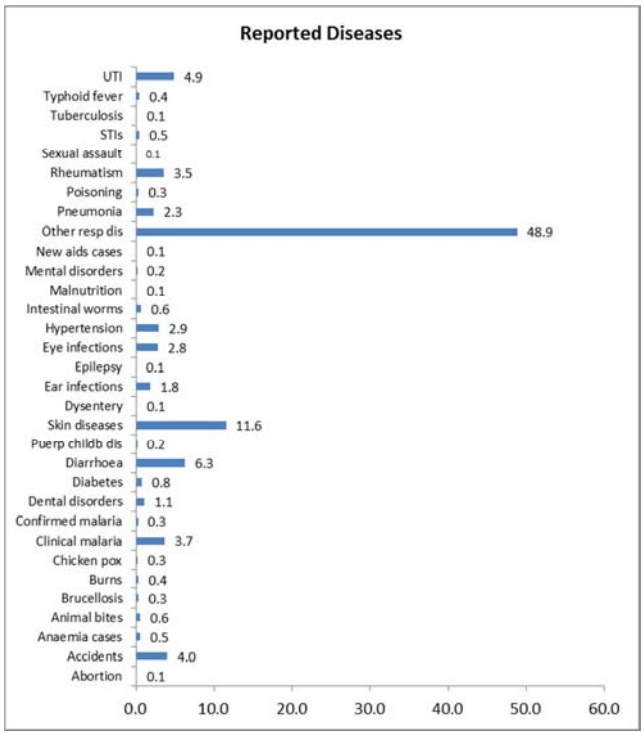


***Figure 2.*** *Morbidities in Machakos County, Kenya, 2014.*

Sources: Reported diseases of January-December 2014 from Kathiani, Kangundo, Mwala, Matuu and Machakos County referral hospital.

## 4. Discussion

Human resources for health at the PHC in Machakos County, Kenya, were found to be idle and causing congestion at the SHC due to patients seeking preventable health care bypassing the PHC centres there by contributing to inefficiency in the health system. There was an average of 2 health care workers per facility in Machakos Country occasioning availability of only one health worker being on duty at any one time, performing consultations, injections and procedures among others. However, the average of 2 health workers at PHC centres in Machakos County was above the ratio of 2.3per 1000 population recommended by the WHO [36]. The findings in this study compared well with those in rural Tanzania, a neighbouring country to Kenya, by Kahabuka *et al*. 2012 [32] but contrary to the study conducted in Kenya by Ojakaa et al. in 2014[33] which stipulated a shortage of HRH at 1.5 health workers per 1000 population in Kenya (a figure below WHO recommendation of 2.3 per 1000 population). The findings also confirmed the

dominance of the PHC management in Kenya by nurse-managers, most of whom were young, married and less experienced. Experience, which was low among health managers, was crucial for informed and correct policy analysis, interpretation, formulation and decision-making at managerial levels, a similarity to those of found in South Africa less than five years ago [34]**.** For that reason (bypassing PHC centres), the PHC services and infrastructure in Machakos County, Kenya, were found to be significantly idle, rendering the system under-utilized, inefficient and the SHC overstretched, thereby lowering quality of health care in the county, findings that were similar to those of Manzi *et al*. (2012) in Tanzania [14]. The fact that access to essential medicines at the PHC centres attracted only 15% of the patients is an acknowledgement that access to drugs at PHC centres in Machakos County was unsatisfactory [18]. On the other hand, patients seemed to have more access to laboratory services than the PHC centres could cater for by design, in accordance with the Kenya Essential Package of Health 2013. The PHC centres scored highly in the public confidence in the competence and care by health staff and access to the PHC centres, meaning that supplies and perceived need for laboratory services may be the bottlenecks to better use of PHC health services and a contributing factor to patients bypassing the PHC centres in preference to hospitals in Machakos County, Kenya, implying that the county had adhered to the requisite staffing norm in comparison to the national standards. A combination of high and low scores resulted in an above average (61%) preference for the PHC services in Machakos County, Kenya. The third measure of efficiency was identification of the PHC morbidity patterns using the 2014 annual morbidity returns data in the county as a sample which witnessed that 66.8% of the conditions don't require laboratory investigations. This confirmed that there was a huge potential for the PHC programme in Machakos County to cut unnecessary costs of laboratory services provision among other costs. Laboratory services were ranked number one as the leading reason for the unwarranted self referrals (56.3%) residents of Machakos county from the community to hospital level and yet, most of the PHC services were preventable diseases such as immunizable diseases eliciting a possibility that there was a mismatch between the public understanding of health systems, care and policy direction which should be addressed. The findings of this study are similar to those of Kahabuka et al. 2012 in Tanzania [32]. This practice in Machakos County was irrational and if quality and good health outcomes were to be achieved with available resources, clients and patients needed to be sensitized, educated, informed and convinced on seeking PHC services instead of sidestepping them and using the available health services rationally and cost effectively, findings that were similar to those of Horvath in her review of best practices in laboratory medicine 2013. These findings were also similar to those of Kahabuka *et al*. for child care in Tanzania, where 42.2% of caretakers bypassed PHC centres due to lack of diagnostic facilities while 15.5% were due to lack of drugs [35]. These findings contradicted the results of the secondary data collected at hospital level on diseases treated which showed that 75% of diseases at hospital level did not require laboratory tests. In the Tanzanian study by Kruk *et al*. (2014) on childbirth, clients reported poor quality of the PHC services as the main reason for bypassing the PHC centres, a similar finding with this study in which complaints about poor services were raised during FGDs. Machakos County experienced a shortage of essential drugs which contributed to patients bypassing the PHC centres to seek preventable health care at the unsuitable and ill prepared SHC centres in order to access to medicines. In this study, availability of drugs accounted for 14.6% of all by passers who cited it as the reason for seeking preventable health care at SHC centres. The results of this study are similar to those of Ahmed et al. 2012 where the availability of drugs accounted for 15%. This high proportion dissatisfaction could be reduced by regularly and consistently providing essential drugs to PHC centres as per the essential list recommended by the World Health Organization [36]. However, the findings of this study were found to be similar to those in Tanzania by Kahabuka *et al*. in which availability of drugs accounted for 15.5%. Knowledge about the PHC services (89.6%) in Machakos County, Kenya, did not exactly match preference for PHC services (61.4%) [35]. This finding implied that 28.5% of the residents of Machakos County, Kenya, needed to be convinced more that PHC services would adequately serve them and lower their costs of health care at SHC facilities[33]. By extension, this study proved the poor health seeking behaviour of Machakos County residents that resulted in dissonant and inefficient allocation and utilization and resources at the PHC level and whose effects spilled massively, negatively and inefficiently into the SHC levels (hospitals). The economic implication of the dissonance in the PHC and SHC level resources allocation and utilization were yet to be scientifically determined in Machakos County, Kenya.

# 5. Conclusion

The majority of patients who bypassed the PHC centres(75.7%)to seek preventable health care at the SHC facilities in Machakos County had health conditions that largely could be treated at the PHC level, of which, 66.8% did not need laboratory services to be treated hence no need for self referrals. This finding led to the conclusion that there was low community-based awareness about the nature, status and services provided at PHC centres in Machakos County. This is a finding that will require a review of demand and supply of health services at each PHC facility catchment area. Subsequently, the residents of Machakos County should be informed, educated and sensitized on the importance of first seeking consultations at PHC before proceeding to the SHC on their own. The findings of this study confirmed the hitherto fact that PHC centres in Kenya were not efficiently and cost-effectively managed. The study also confirmed that health care staffing at PHC centres in Machakos were above

those recommended by the WHO occasioned by the large numbers of self referrals of patients from the community, bypassing the PHC centres to the SHC facilities. The HRH element in Machakos County was therefore, not an issue and equally, there had been no concern about supplies and consumables, confirming that Machakos County had fulfilled its mandate based on the three domains discussed for efficiency of the devolved health system in Kenya. For the PHC programme Machakos County to function properly, it must avail affordable essential medicines, consumables, infrastructure and human resources for health. By focusing on availing essential drugs and consumables, motivating HRH and developing the health infrastructures, it is envisaged that it would reduce the number of patients bypassing the PHC centres and restrict SHC for special cases that needed to be handled by consultants in their different specialties. Hence, there was need for the County government to attractively scale up promotion of PHC services as part of the intervention to redirect patients seeking preventive health care services back to the PHC centres in the county. This study therefore, lays the blame on the underutilization of resources at the PHC level on the patients and the solution rests on the policy makers in Machakos County, Kenya, to reverse this trend.

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