

The Relationship between Policy Availability and Capacity Levels for Disaster Preparedness in Hospitals within Nairobi County.

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Abstract.

Increased disaster cases coupled with the fact that Nairobi County joined the World Disaster Reduction Campaign among which one of the themes was 'Hospitals safe from disasters', made it important that disaster preparedness in hospitals within Nairobi County be examined. No studies have been done regarding disaster preparedness in hospitals within Nairobi County, making this study a key resource for evidence-based decision making, especially in resource needs prioritization. The broad objective of this study was to determine the relationship between policy availability and capacity levels for disaster preparedness in hospitals within Nairobi County. The specific objective was to determine the relationship between availability of policies and level of capacities in hospitals within Nairobi County. This was a descriptive cross sectional study. The study setting was in Nairobi County, Kenya. A total of 32 hospitals and 263 respondents were sampled. Research instruments used comprised questionnaires and key informant interviews. Quantitative and qualitative data was obtained. Quantitative data was of use in determining the statistical significance of the study. Qualitative data aimed at obtaining in depth information regarding challenges and recommendations to hospital disaster preparedness on the basis of how policy availability and capacity levels relate. Study results revealed that there were problems related to staffing, hospital equipment, hospital infrastructure, policies, training and drills. In conclusion, a positive relationship existed between policy availability and capacity levels with capacities being dependent on policies. Policy availability was established to be dependent on the finance and stewardship health system pillars. This study recommends that for maximization of health resources towards disaster preparedness in hospitals within Nairobi County, policy formulation and implementation should be prioritized with emphasis on funding and good stewardship. This will result in a strengthened health system with institutional capacities in place.

Key Words: *Disaster preparedness, Policy availability and capacity, Policy formulation and implementation, Health systems, Hospitals.*

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Background

According to the World Health Organization (WHO), the health sector is faced with limited resources that require prioritizing, more so in low-income countries like Kenya, for Health System (HS) efficiency and effectiveness (WHO, 2000). The Government of Kenya (GoK) defines disaster preparedness as precautionary measures taken in advance for an imminent threat of a disaster in order to empower people or institutions to respond to and cope with the potential impact of a disaster (GoK, 2010). Health Systems (HS) is defined as all organizations, institutions and resources that are devoted to producing health actions (WHO, 2000). Nairobi County has been faced with numerous disasters in the recent past ranging from mudslides, fires to terrorism cases (Kenya Broadcasting Corporation, 2010; The Associated Press, 2011; Waba 2012; Momanyi 2012 and Ralph 2012).

Policies and capacities are the basic disaster preparedness variables. Indicator measures for capacity include staff knowledge, staff capabilities, drills, training, hospital equipment, hospital infrastructure and the hospital surroundings. Key disaster preparedness indicators for policies include policy existence and policy implementation. These were arrived at upon review of studies by The Joint Commission Standards of care for Disaster Preparedness and Response (Response Systems, n.d.), Adiniet al (2006), The United States Office of the Assistant Secretary for Preparedness and Response/ASPR (ASPR, 2012) and the Pan American Health Organization (PAHO) in conjunction with WHO (PAHO, 2004).

There existed very limited information on how policies and capacities for disaster

preparedness interrelate for Health System Strengthening. According to PAHO (2007), policies that result in health sector reforms formed the basis for interactions within the health systems which directly influence the health systems' capacity. From their studies, it emerged that the closer the integration within a single system or between the different sub-systems in a mixed system, the better the response capacity of the system as a whole and the lower the operating costs (PAHO, 2007).

The World Conference on Disaster Reduction adopted the Hyogo Framework for Action (HFA) 2005-2015 (United Nations International Strategy for Disaster Reduction, 2005). The United Nations General Assembly endorsed the HFA and the United Nations International Strategy for Disaster Reduction (UNISDR) was established to implement the HFA (UNISDR, 2005). The HFA had five specific priorities for action namely: making disaster risk reduction a priority; improving risk information and early warning; building a culture of safety and resilience; reducing the risks in key sectors and strengthening preparedness for response (UNISDR, 2005).

Nairobi County joined the World Disaster Reduction Campaign in the year 2010 with the theme "Making cities resilient-My city is getting ready" (UNISDR, 2010). International consensus views disasters as barriers to progress on the health-related Millennium Development Goals (MDGs) through health system disruption that leaves many without access to healthcare (Global Platform, 2011). By agreeing to join the World Disaster Reduction Campaign, Nairobi County agreed to the main aim of the World Disaster Reduction Campaign which is to increase public awareness

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worldwide and across all professional sectors about the measures that can be taken to reduce risk and vulnerabilities of societies and communities to the negative impacts of natural hazards (International Strategy for Disaster Reduction, 2002).

Health systembuilding block (pillars) that strengthen health systemsfor effective healthcare service delivery to victims include service delivery, health workforce, information, financing, stewardship, medical products, vaccines and technologies (WPRO, 2012).

The broad objective of this study was to explore the policies and capacities for disaster preparedness in hospitals within Nairobi County, Kenya. The specific objective was todetermine the relationship between availability of policies and level of capacities in hospitals within Nairobi County.

Materials and Methods

This was a descriptive cross sectional study.The study setting was in Nairobi County, Kenya. Hospitals within Nairobi County were studied because Nairobi County had joined the World Disaster Risk reduction campaign. Hospitals in Nairobi County Kenya were identified through checking the list of hospitals registered by the Ministry of Health of Kenya, and were found to be (42) forty-two (e-Health Kenya, 2010). This was a limited sample, so total purposive sampling was done. Upon contacting all hospitals, only 38 hospitals initially gave positive feedback to allow for data collection. However, only 32 hospitals eventually cooperated during the research. Of the 32 hospitals, 9 were public hospitals and 23 were private hospitals. In

order to gather information in hospitals within the County, hospital staff had to be study respondents.

Random sampling was then used to determine the number of administrative and clinical staff to be included in the study. Based on information by Ndetei, Khasakhala and Omolo, (2008), the number of administrative and clinical staff in Nairobi County was obtained to be 18707. To calculate the sample size needed, the Slovin's formula for random sampling (Ariola, 2006) was used.This formula was used to get the representative sample at 95% level of confidence.

$$n = N/(1+Ne^2)$$

Where n = sample size

N = Target Population size

e = error margin = 5%

$$n = 18707/(1+18707*0.05)$$

$$= 391.6$$

Approx...400

The estimated sample size obtained was 391.6 and this was adjusted to 400. 263 respondents out of the targeted sample of 400 respondents participated in the study. These comprised approximately 65.75% of the total expected respondents with 200 of them being clinical staff while 63 were administrative staff. Respondents comprised health workforce in the hospitals. They were divided into clinical and administrative staff. The clinical staff included in the study were those charged with the primary responsibility of saving lives: doctors, nurses, laboratory

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technicians, pharmacists, dentists, clinical officers, physiotherapists, pharmaceutical technologists and occupational therapists. The major contribution of clinical staff to this study was their knowledge, capability and competences in the eventuality of an emergency in such a way as to ensure maximum efficiency and effectiveness of hospital resources. Administrative staff comprised those responsible for coordinating the health system processes to ensure that quality of healthcare administered to patients was in line with health system strengthening. They comprised: the Chief Medical Officer, Financial Controller, the Head of the Disaster Management Committee, the head of Communications Department, and the Director, Human Resources. The main contribution of administrative staff as respondents was their information on policy existence and policy implementation.

The number of clinical to administrative staff per each hospital that was to be included in the study was determined using probability proportionate to size so that the results could be truly representative of the population under study. Using Ndetie et al (2008) percentage of administrative staff (32.9%), then for every 11 respondents, 4 had to be administrative staff and 7 clinical staff.

Research instruments used comprised questionnaires and key informant interviews. Questionnaires were self-administered to clinical staff and comprised both close and open-ended questions for more in-depth responses. Key informant interviews were administered to administrative staff and had structured questions as a guide.

Descriptive data analysis techniques were used in the study. This included the use of frequencies and percentages. To

measure the relationship between policy availability and disaster preparedness, correlation coefficients were used. The following null hypotheses were tested using p values at 5 percent significant level to determine whether to reject the null hypothesis or not. Ho1: There was no correlation between policy existence and policy implementation. Ho2: There was no significant relationship between availability of policies and institutional capacities in disaster preparedness in Nairobi County, Kenya. When the p value was less than 0.05 the null hypothesis was rejected and otherwise accepted. The p value expresses the probability that the results at least as extreme as those obtained in the sample are due to chance (Sarah & Watters, 2008).

Results

Table 1 shows results on challenges to disaster preparedness as given by respondents within Nairobi County. Challenges were categorized into four namely: staff; policies; hospital equipment and infrastructure; training and drills. Results showed staff to have the highest percentage of challenges, followed by hospital equipment and infrastructure, then policies and least of all was training and drills as a category.

As indicated in Figure 1 below, the highest staff related challenge identified by the respondents was poor commitment followed by inadequate numbers of staff knowledgeable in disaster matters. Inadequate training in disaster matters ranked third in the list of staff related challenges.

Concerning hospital equipment and infrastructure, poor equipment maintenance

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Table 1: Table showing challenges observed in disaster preparedness in hospitals within Nairobi County.

CHALLENGES	Specific challenge.	Number of respondents/ Total respondents	%.
Staff (110/263) 42%	Poor commitment	61/110	55.5%
	Inadequate staff.	37/110	33.4%
	Inadequate training	12/110	11.1%
Hospital equipment and hospital infrastructure, (86/263) 32.6%	Inadequate equipment.	28/263	10.2%
	Poor equipment maintenance.	29/263	11.2%
	Drugs shortage	29/263	11.2%
	Inadequate funding	32/263	12%
Policies, (50/263) 18.9%	Inactive disaster management department.	8/263	3%
	Fund misappropriation.	5/263	2%
	No policies exist.	2/263	1%
	Inadequate training and drills.	17/263	6.3%
Training and drills, (17/263) 6.3%			

and drug shortages ranked higher than inadequate equipment. Table 2 below is an illustration of results from respondents concerning recommendations to disaster preparedness in hospitals within Nairobi County. These recommendations were categorized into four namely; staff, policies, hospital equipment and infrastructure, training and drills. Policies had the greatest weight in terms of recommendations followed by hospital equipment and infrastructure, then training and drills and least of all staff.

Discussion

In Table 1 above, it was evident that challenges existed with regard to disaster preparedness variables with most challenges attributed to the following order of severity: staff; equipment and infrastructure, policies; drills and training. It was also notable that the surrounding environment around hospitals was not viewed as a challenge by respondents and this augured well with findings obtained by participant observation as regards the same.

Norman et al. (2012) pointed out incompetent health personnel in Ghana as a challenge. As shown in Figure 1, inadequate training which results in incompetent health personnel accounted for only 11.1%. In a similar study in Ghana, Norman et al. (2012), it emerged that Ghana had less staff (health personnel) challenges than Nairobi County as regards disaster preparedness. This was especially so since the recommendation given as regards health personnel in Ghana only referred to incompetence, yet in Nairobi County in addition to inadequate training that causes incompetence, there was poor commitment and inadequate staff both of which had higher percentages than inadequate training (Figure 1).

As indicated in Figure 2, 11.2% said there was poor maintenance of the available disaster management hospital equipment, resulting in unserviceable equipment when needed most during service delivery in disaster situations. The study revealed that equipment like smoke detectors and hose reels existed but a large percentage was unserviceable and therefore of no effective use when required. Figure 1 also indicated

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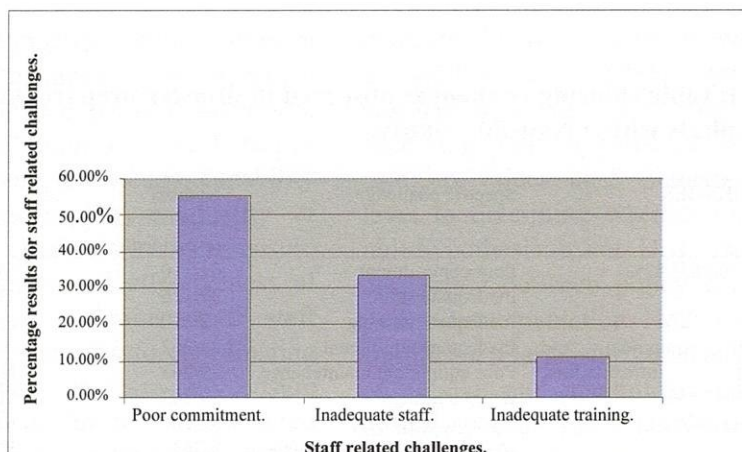


Figure 1: Graph showing staff-related challenges in % form.

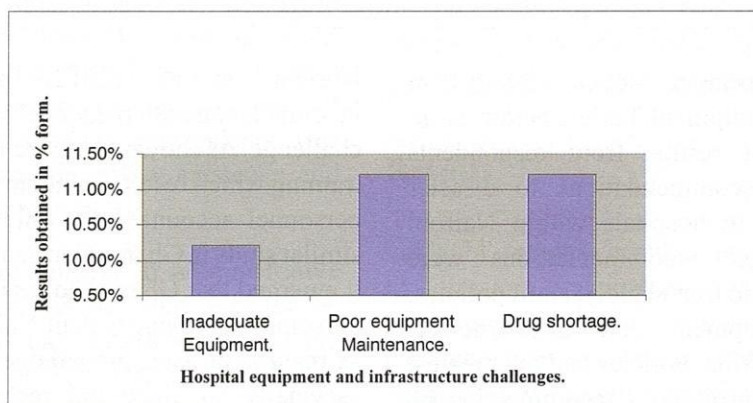


Figure 2: Graph showing % results for hospital equipment and infrastructure challenges.

that a similar percentage of respondents (11.2%), cited drug shortage during disasters as a major challenge that results in ineffectiveness in service delivery. Drug shortage as a challenge (Figure 2) agreed with findings from Norman et al. (2012). It is therefore of necessity that drug shortage during disasters be adequately addressed in disaster preparedness.

Concerning policy-related challenges, inadequate funds were mentioned to be the main issue. As indicated in Table 2, the highest percentage of respondents (21%) sighted the need to increase funding. This once again agreed with the findings by

Lurie (2011), who noted that in the United States of America, after subsequent anthrax attacks in the past decade, funding to support health preparedness was increased which led to over 75% of the hospitals participating in the Hospital Preparedness Program. Policies also came up as a major recommendation in Ukraine (WHO, 2012), with focus on hospital responsibility to patients, risk reduction plan and a plan for mass casualty response. In Nairobi County, however, recommendations on policies were pegged on funding and accountability addressing the financial and stewardship pillars of the health system strengthening.

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Table 2: Table showing recommendations for disaster preparedness in hospitals within Nairobi County as given by respondents.

RECOMMENDATION (Respondents)	Specific recommendation	Number of respondents/ Total respondents	%.
Policies (87/263), 33%	Increase funding	55/263	21%
	Transparency in handling of funds	18/263	7%
	Implement policies	18/263	7%
	Set up a disaster management department.	14/263	5%
Hospital equipment and hospital infrastructure. (58/263), 22%	Hospital expansion	21/263	8%
	Buy more equipment.	19/263	7%
	Regular servicing of equipment.	17/263	6%
	Stock up drugs in pharmacies.	3/263	1%
Training and drills (32/263), 12%.	Increase frequency of drills.	29/263	11%
	Provide preparedness manuscripts for staff.	3/263	1%
Staff (16/263), 6%.	Employ more staff	13/263	5%
	Employ disaster management professionals.	3/263	1%

It was also noted that policy challenges with regard to good stewardship practices which is necessary for transparency in handling funds was noted by only 7% of the respondents indicating that the respondents thought that right measures for use of funds reserved for policies existed (Table 2). This observation, however, did not necessarily hold water especially for public hospitals where funding towards policy implementation was at 88.9% yet capacity existence was at 64.87% showing a drastic reduction in percentage (Ndetei, 2008). Going by the obtained results, that fund misappropriation was at a minimum in these public hospitals and policy implementation as well as a budget existed, then the underlying policy issue in public hospitals had to be inadequate funds (Table 2). This could be so since public hospitals had more hospital beds (52.5% in comparison to 47.4% in private hospitals) indicating that they served a larger number of patients than private hospitals, therefore in spite of their higher funding and policy implementation, their daily patient turnout was still high, resulting in further division of funding into

various capacity indicators with an overall result of less mean capacity compared to private hospitals (Ndetei, 2008).

Key to note was that from previous studies, existence of disasters policies as a challenge was sighted only by WHO (2010) in Poland implying that policies was not a major challenge to disaster preparedness generally. The same could be said of this study since non-existence of policies scored least percentage (1%) (Table 1). It also emerged that the challenge in policies in Poland was that there was little awareness of the same by the supposed implementers (WHO, 2010). In Nairobi County however, the main challenge in terms of policies was funding (Table 3), implying that awareness of policies was not really a challenge and had the funding been available, then implementing policies would not be a challenge in disaster preparedness within Nairobi County.

Only 17 (6.3%) out of the 263 respondents (Table 1) said the major challenge was inadequate drills and training. Inter-hospital

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training and inter hospital drills were rated the least in terms of disaster preparedness capacity indicators. This gave an indication that from the employee perspective, training and drills were either not regarded as important to disaster preparedness or that employees were not aware of the impact of training and drills on disaster preparedness. It is for reasons such as these that studies are done to generate information for evidence-based decision making hence the inference that staff were not informed on how important training and drills were in enhancing disaster preparedness.

With regard to hospital equipment and hospital infrastructure, greater emphasis was put on hospital expansion, increase of emergency equipment than regular equipment servicing (Table 2). This compared favourably with a study done by Valeskyetal. (2011) that stressed the need to increase communication equipment as a recommendation after studying the disaster preparedness system in South African hospitals.

As indicated in Table 2, the second highest percentage of respondents (11%) gave recommendations on drills and training. The respondents' answers wanted frequency of drills increased. Drills was also recommended by WHO (2010) for hospitals in Poland and Stander et al. (2011) for hospitals in South Africa. In South Africa, it was further recommended that collaborative partnerships be increased, which from results obtained in this study, was an important recommendation for Nairobi County, yet none of the respondents saw its need as a recommendation. Notably, increasing the number of drills performed per year by staff in hospitals, as well as increasing inter-hospital drills

would require setting up policies on the same and implementing them. Thus, the recommendations on drills still peg down to the policies indicator variable.

Staff knowledge and staff capabilities which were capacity indicator measures in this study were not mentioned as recommendations. It was evident that the respondents believed that the challenge with regard to staff was in employee numbers and hence proposed that more staff be employed (Table 5) to ease the feeling of being overwhelmed at work, hence increase concentration on matters of disaster preparedness and service delivery for health system strengthening. As such, it emerged that much as staff posed the greatest challenge, there were underlying causes like inadequate staff. From the percentage of respondents that suggested employment of disaster management professionals to be employed to train and manage staff on disaster preparedness, it was evident that training and managing staff on disaster preparedness was not highly prioritized and this was attributed to the fact that the staff considered themselves and results rated them as knowledgeable and of relatively high capability. Employment of more staff is a stewardship responsibility in health systems hence is linked to policy existence and policy implementation.

In this study there were two hypotheses. The first one stated as follows:

Ho1: There is no correlation between policy existence and policy implementation. Hypotheses' testing was done using SPSS. For the first hypothesis that 'there is no correlation between policy existence and policy implementation', raw data for question four (Q4) of key informant interviews (do policies exist?) and for

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question five (Q5) (are the policies implemented) was analysed using Pearson's r correlation test. Results obtained were as tabled below:

Where:

Q4: Question four of the key informant interview 'Do policies exist?'

Q5: Question five of the key informant interview 'are the policies implemented?'

Results showed a strong positive correlation between policy existence and policy implementation [$r=0.709$, $n=63$, $p=0.000$]. Pearson's r was 0.709 meaning that as policy existence increased, policy implementation increased hence a positive correlation between the two measurements. A scatter plot obtained from SPSS for these results was as shown below:

Table 3: Table showing SPSS output for Pearson's r test for policy existence versus policy implementation.

		Q4	Q5
Q4	Pearson Correlation	1	.709(**)
	Sig. (2-tailed)	.	.000
	N	63	63
Q5	Pearson Correlation	.709(**)	1
	Sig. (2-tailed)	.000	.
	N	63	63

** Correlation is significant at the 0.01 level (2-tailed).

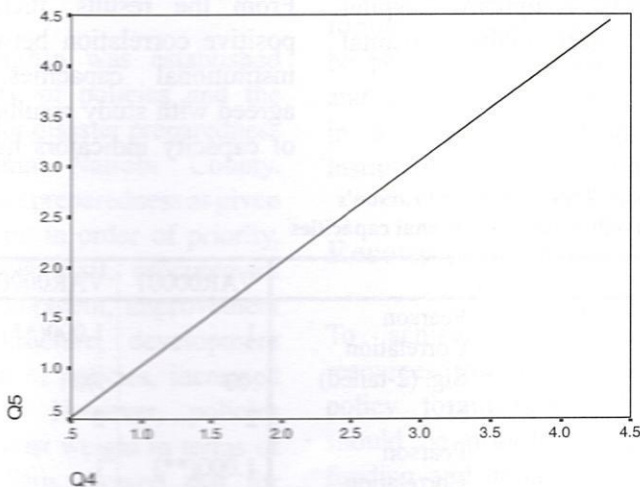


Figure 3: Scatter plot showing the relationship between Q4 (policy existence) and Q5 (policy implementation) as obtained from SPSS.

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The second hypothesis stated:

Ho2: There is no significant relationship between availability of policies and institutional capacities in disaster preparedness in Nairobi County, Kenya.

The hypothesis was that 'there is no significant relationship between availability of policies and institutional capacities in disaster preparedness in Nairobi County, Kenya'. SPSS was used for data analysis. Mean percentages for indicator measures for policies and capacities were keyed into SPSS and Pearson's r test computed. This result led the study to reject the hypothesis.

Results obtained were as shown in Table 4 below.

Where:

VAR00001: Mean percentages for indicator measures for policies (policy existence and policy implementation).

VAR00002: Mean percentages for indicator measures for capacities (staff knowledge, staff capabilities, drills, training, hospital equipment, hospital infrastructure, surrounding hospital environment).

From the results, there was a strong positive correlation between policies and capacities [$r=1.00$, $n=2$, $p=.00$]. Pearson's r was 1.00, meaning that as policies increase, capacities for disaster preparedness increase. The p obtained of 0.00 was lower than the alpha level of 0.05 hence data obtained from this study with regard to the relationship between policies and capacities was reliable and of use in making statistical inferences. Thus the hypothesis that 'There is no significant relationship between availability of policies and institutional capacities in disaster preparedness in Nairobi County, Kenya' was rejected. These results agreed with study results whereby in spite of capacity indicators having the greatest percentage of challenges, policies was given the greatest weight under recommendations indicating that, respondents felt that dealing with policy issues will result in capacity indicators being dealt with, thus making the level of capacities to be dependent on availability of policies for disaster preparedness. The scatter plot obtained from computing hypothesis results was as shown in Figure 4 below.

From the results, there was a strong positive correlation between policies and institutional capacities. These results agreed with study results whereby in spite of capacity indicators having the greatest

Table 4: Table showing SPSS output for Pearson's r test for policy availability and institutional capacities

		VAR00001	VAR00002
VAR00001	Pearson Correlation	1	1.000(**)
	Sig. (2-tailed)	.00	.00
	N	2	2
VAR00002	Pearson Correlation	1.000(**)	1
	Sig. (2-tailed)	.00	.00
	N	2	7

** Correlation is significant at the 0.01 level (2-tailed).

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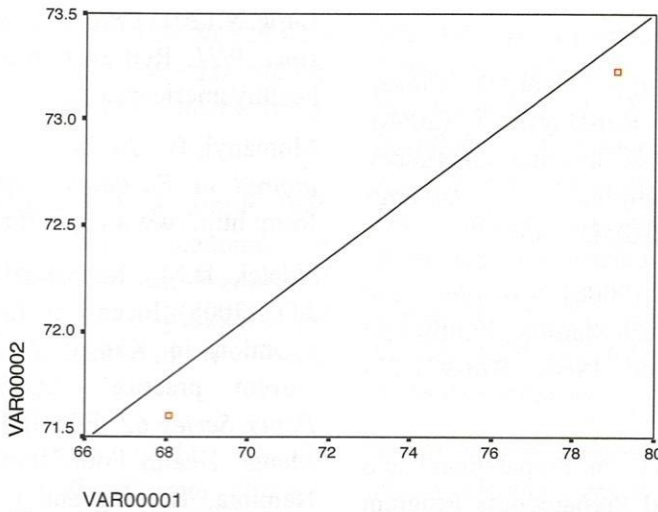


Figure 4: Scatter plot showing the relationship between variable 1 (Policies) and variable 2(Capacities) as obtained from SPSS.

percentage of challenges, policies was given the greatest weight under recommendations indicating that, respondents felt that dealing with policy issues will result in capacity indicators being dealt with, thus making the level of capacities to be dependent on availability of policies for disaster preparedness.

Conclusion

A positive relationship was established between availability of policies and the level of capacities for disaster preparedness in hospitals within Nairobi County. Challenges to disaster preparedness as given by respondents were: in order of priority, employment of more staff, procurement of more hospital equipment, improvement of hospital infrastructure, development and implementation of policies, increased training and drills. However, policies were given the greatest weight in terms of recommendations. This showed that for effective disaster preparedness measures in hospitals within Nairobi County, it was of the respondents' view that policy existence

and implementation be prioritized to ensure increased hospital capacity and disaster preparedness and ultimately health system strengthening. With regard to policies, it emerged that finances and accountability strategies had to be in place, thus pegging this third finding on the finance and stewardship health system pillars respectively. This study advocated for maximization of health resources towards disaster preparedness in hospitals within Nairobi County, policy formulation and implementation should be prioritized with emphasis on funding and good stewardship. This will result in a strengthened health system with institutional capacities in place.

Recommendation

To achieve maximization of health resources towards disaster preparedness, policy formulation and implementation should be prioritized with emphasis on funding and good stewardship. This will result in a strengthened health system with institutional capacities in place.

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