

Electricity Power Supply Shortage on Health Service Delivery of Health Institutions in Harare, Zimbabwe (2010-2015)

¹Dr Johannes Marisa and ²Dominic Uzhenyu

¹Medical practitioner, Westview Clinics.

²Senior lecturer, Faculty of Commerce and Law, Zimbabwe Open University, Harare and Chitungwiza regional campus.

Abstract: The study was conducted after serious challenges were continuing to affect the health delivery system due to ZESA power cuts especially between 2010 and 2015 in the four sampled health institutions in Harare. Literature reviewed covered among other concepts, health service delivery systems, electricity supply in the Zimbabwean context and also studies done by others, which helped to compare and identify the research gap. The descriptive survey design was used. The target population comprised those who worked or administered in the 4 health institutions, ZESA officials, and officials from the parent Ministry of Health and Child Welfare and patients. Both the quantitative and qualitative paradigms were used. The largely structured questionnaire and unstructured interview guide were used to collect data. From the 110 questionnaires distributed, 94 were completed and returned, giving an overwhelming response rate of 85%. 21 participants were interviewed. Prior to the finalisation of the instruments, a pilot study was done largely to pre-test the instruments, which were then refined in order to improve both data reliability and validity after taking cognisance of the pilot subjects input and remarks. Data was presented and analysed using descriptive statistics for the questionnaire responses and the content analysis was used to analyse the interview responses. The sample composition took into account representation of both government and private owned health institutions to give a balanced view. The study established that electricity power shortage was adversely affecting the entire health delivery system. At times patients and their relatives lost confidence in the health delivery system as a number of deaths and complications were due to such power shortage. The electricity power shortage even affected surgical operations, drug inventory and drug shelf life, medical tests and examinations which resulted in some services being postponed. The study suggested that the health institutions should be exempted from power units (load shedding) and if that failed, they should resort to the use of solar energy and efficient generators although this comes at a huge cost.

Key Words: Health institution, Health service delivery, Maternity, Medical examination, Power shortage, Surgical operation, Survey

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I. I Background to the study

Zimbabwe used to generate enough electricity energy (power) that covered all parts of the nation and was the source of electricity from where other neighbouring countries such as Namibia, Mozambique and Botswana used to import power. However, due to the increase in her population and infrastructural development especially after independence, the generated power is no longer enough to cater for the whole nation. More so, the generators at Kariba dam, where electricity is generated, are no longer serviced and maintained due to financial problems on top of them being outdated. As a result, health service delivery, like other essential services, has been negatively affected due to power cuts. This has impacted much on central hospitals with no sparing of even peripheral health centres.

The empirical evidence has shown that some health institutions have been forced to retrench their staff members as their machines stopped working after having been seriously affected by the continuous power cuts. This has affected the smooth operations of some health institutions resulting in preventable, unjustified deaths and other health complications which possibly could have been averted under normal electricity supply.

More so, the number of patients requiring medical services has been on the decline and more so, the viability and sustainability of health institutions have been threatened hence the study attempted to investigate the impact of the load shedding in the following four health institutions in Harare namely; Harare Central Hospital, Suburban Hospital, Kuwadzana Polyclinic and Westview Medical Centre. Among these four health institutions, Harare Central is a government hospital, Kuwadzana polyclinic is a council clinic while Suburban and Westview are private health institutions.

Harare Hospital was established in 1958. The hospital has a capacity of 1200 beds offering the following services; maternity, mortuary, ultrasound scanning, X-rays, CT scans, ICU, wards, kitchen, theatre, pharmacy. The hospital has standby generators which supply power to ICU and theatre but some wards are not connected to the generators, leaving them in darkness in times of load shedding. Suburban hospital was established in 1994 and has a capacity of 35 beds offering the following services; maternity, theatre, ultrasound scanning, X-rays and other health services. Kuwadzana polyclinic was established in 1990 with a capacity of 60 beds and offers maternity, theatre and other primary health care services. Westview Medical centre was established in 1998 with a capacity of ten beds and offers, among other things, ultrasound scanning, dental services and X-rays. Since the above mentioned health institutions have equipment that uses power, the study aimed to investigate the impact of power cuts caused by load shedding on health service delivery.

II. Statement of the problem

The perennial electricity power shortage due to excessive load shedding seriously affected the health delivery system countrywide on key service areas like; surgical operations, life support system, drug storages, scans, x-rays/ medical tests and examinations as well as in-patient and out-patient units. As a result, some deaths occurred which possibly could have been avoided under normal electricity supply. The number of theatre cancellations and postponement has been on the increase from about 10% of all booked patients in 2010 to about 48% of all cases as in 2015. The number of patients requiring medical services had been on the decline and more so, the viability and sustainability of health institutions has been threatened. Two pharmacies from two of the stated institutions discarded more than 56% of their refrigerated drugs because of failure to maintain the cold chain. This study therefore intended to look at selected four health institutions in the capital city, Harare, with a view to establishing the consequences of erratic electricity supply on the health delivery system in order to come up with recommendations that should alleviate this problem.

III. Objectives of the study

This study intended;

- (i) to establish the magnitude of electricity power shortage on the effective conducting of surgical operations.
- (ii) to find out the impact of electricity shortage on drug storage
- (iii) to determine the extent to which maternity activities are affected by power shortage.
- (iv) to find out the impact of power shortage on the conducting of medical examinations, x-rays, scans and other tests.
- (v) to find out other challenges arising from power shortage on health service delivery

IV. Research questions

The study intended to answer the following questions after conducting the empirical study

- (i) What is the magnitude of electricity power shortage on the effective conducting of surgical operations?
- (ii) To what extent does electricity shortage affect drug storage?
- (iii) What is the extent to which maternity activities are affected by power shortage?
- (iv) How has power shortage affected the conducting of medical examinations, x-rays, scans and other tests?
- (v) Which challenges arise from power shortage on health service delivery?

V. Literature review

5.1 Definition of key terms

5.1.1 Health service delivery can be defined as the extent to which health services provided culminate in customer (patient) satisfaction according to Chanda (2014). Chanda (2014) also views health service delivery as it encompasses the management and delivery of quality and safe health services so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, through the different levels and sites of care within the health system, and according to their needs throughout the life course.

5.1.2 Electricity power shortage refers to regular electricity power cuts by ZESA that results in load shedding so that critical areas maybe prioritised ahead of other areas like domestic consumption (Zhou, 2013).

5.2 Theoretical Framework

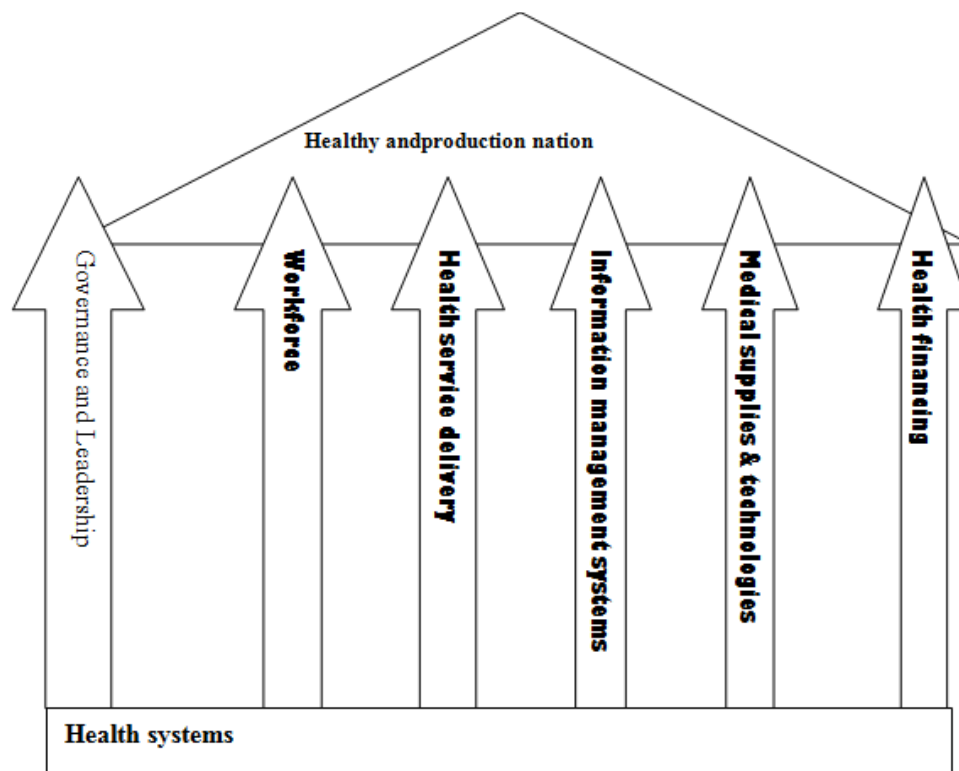


Fig 1: Health Policy and Systems Development (Chanda, 2014)

It is probably prudent to think of these **building blocks** (*Governance and leadership, Workforce, Health service delivery, Information management systems, medical supplies and technologies, Health financing*), as pillars of an effective health system. It can be argued that working together; they lead to a healthy and productive nation. Chanda (2014) says health system consists of people, structures, resources and mechanisms whose purpose is to work together in order to improve the health of the people in defined communities. A community can be an entire country, a province, a district, a chiefdom etc. in the absence of electricity, it means that the pillars of health will be seriously affected. Pollock and Duffy (1986) argue that load shedding can lead to the poor healthy and unproductive nation. (Musadamba *et al*, 2012) indicated that the health system consists of the pharmacies, the laboratories, the hospitals, the people, resources and mechanisms whose purpose is to work together in order to improve the health of the people in defined communities, could be affected if there is no power.

It must, further, be recognised that health is an investment which has a direct linkage with development. Having defined health as a state of complete mental, physical and social wellbeing and not merely the absence of disease, this definition implies that the determinants of health are complex and multiple (Chanda, 2014). Although only mental, physical and social wellbeing, it goes far beyond these to include political, economic, social, technological, environmental and legal factors. Chanda (2014) states that integrated health services encompass the management and delivery of quality and safe health services so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services, through the different levels and sites of care within the health system, and according to their needs throughout the life course. The following diagram will conceptualise on the main objective of health institutions. The health institutions are mainly concerned on health service delivery such that people get the right service at the right time and place. It can be argued that load shedding can therefore affect the building blocks of health, which are regarded as the pillars.

5.3 Effects of power shortage

It can be argued that in the event that there is no power, the pharmacies could face serious challenge on where to store their drugs. In some cases, the pharmacies are likely to incur losses and ended up disposed the affected drugs (Chanda, 2014). Furthermore, it becomes difficult for the laboratories to conduct their tests on the

sample of blood they collect from the health institutions. Their machines use power and when there is no power, it becomes difficult for them to conduct such tests (Musademba *et al.*, 2012). It can be further argued that the blood sample cannot last longer when it is not stored in the refrigeration. The empirical evidence has shown that it becomes difficult to convince the patient for re-bleeding. There are cases where patients would deny the second chances of re-bleeding; hence compromise the investigations. It can also be further argued that, during surgical operations like laparotomies, craniotomies and other major operations conducted when the patient is connected to oxygen, and other operations that require the presence of power, could be seriously affected and cause deaths. Frank (2012) recorded some deaths in countries like Japan and South Africa. Drugs like insulin which is used in Diabetes, consumables such as specimen bottles, nasogastric tubes, intravenous colloids like blood, plasma derivatives for example platelets which are needed by the blood for clotting may be severely affected because of the shameless power cuts that automatically reduce the affected drugs to mere placebos because of potency loss. Prompt laboratory investigations that are vital for human life may be hindered without power to run the machines which effectively delays treatment with resultant progression of fatal ailments which could have been contained had earlier investigations been done and early treatments instituted. That alone is enough to compromise the quality of health service that the patients receive effectively reducing the quality of life for the populace (Zhou, 2013).

Chanda (2014) argues that putting more investments in health systems leads to improved health, improved health at different levels leads to a healthy workforce, a healthy workforce improves productivity which leads to increased production and increased production stimulates development which leads to improved quality of life. In order to achieve this, there must be power in the entire nation. Power becomes the cornerstone to development of the nation. Chanda (2014) further argues that the health service delivery is the immediate output of all the inputs into the delivery system. The organisation of this delivery determines to a large extent if the inputs lead to the desired output: access to quality care. Delivery of health services is produced at the interface with the population (Chanda, 2014). The most atomised product of this is the interaction between a single health provider and patient. However, in the perspective of a (national or local) health service delivery perspective, it comprises the sum total of services in a specified area. (Soucat, 2004) states that the term 'health service' can refer both to the organisation that supplies care and to the specific product which is delivered. Moyo (2013) argues that that health services can also mean all services that have as primary purpose to the improvement of health. The concept includes general health care and services that are aimed at specific health problems; disease control interventions and services responsive to suffering of individuals; preventive and curative services; personal health services and population-based activities.

5.4 Health delivery system

Soucat (2004) argues that health service delivery can be classified along different characteristics. Health service can be delivered to the population (and, in some cases, by the population) via specific modes and channels (Soucat, 2004). Examples are different types of health facilities providing health services (such as clinics, health posts, health centres, district hospitals), but also outlets for health-related goods (such as pharmacies, informal drug outlets, mobile drug peddlers etc.), and other entities (such as mobile teams, community health workers, vaccination campaign teams, etc.) (Chanda, 2014). These can be classified in a variety of ways. Examples are family-oriented community-based services; population-oriented schedulable services; individual-oriented clinical services at different levels (primary level, first referral level and second referral level) (Van Damme *et al.*, 2010).

5.5 Load shedding

Zhou (2013) argues that when there is load shedding in the country, the health service delivery could be comprised; hence there is need for the government to do something in order to save the lives of the people. Load shedding is the purposeful cutting off of electric current on specific lines when the demand gets to be more prominent than the supply ([www.thefreedictionary.com/definition/load shedding](http://www.thefreedictionary.com/definition/load+shedding) assessed on 04/04/2016). This is usually done to prevent the failure of the entire system when the demand strains the capacity of the system. Zhou (2013) contends that load shedding goes back to the year 1995 and to date it has come to bumpy and unpleasant levels in spite of the country being enriched with the characteristic waters of the Zambezi River's Kariba dam and the Hwange coal plant for hydro and thermal electrical power generation respectively. Shumba (2014) recognized that Zimbabwe's power emergency keeps on exacerbating as load shedding has turned into the day's request with most key commercial business that incorporates mining, farming and tourism being adversely affected. Zimbabwe without further ado produces 1,300 megawatts of power which is way short of daily national prerequisites of around 2,200 megawatts (Matimire 2014). Matimire (2014) viewed that the national electricity provider estimates to generate 6, 200 megawatts in the next decade to sufficiently power the economy but due to organisational politics meddling within the organisation, the challenge may remain a tall order.

The research conducted by Musadamba *et al* (2012) in Chinhoyi on load shedding, found out that some of the hospital equipment was damaged such as Ultrasound scan machines and other sensitive equipment which includes Computed Tomography, Magnetic Resonance Imaging machines. It was noted that at times, the power could just cut off while the machines were on, and immediately came back, before the machines were switched off. It can also be argued that the government has lost thousands of dollars in repairing the damaged equipment, which is an automatic drain on the fiscus. It was further noted that patients found it difficult to get services such as X-rays, Ultrasound scans and CT scans whilst the government was trying to repair the damaged equipment. As a result, some patients had to be whisked to Harare from Chinhoyi which is a distance of more than 100km in search of such crucial services. Moyo (2013) stated that since there is bureaucracy in government especially in repairing damaged equipment; the process took long, hence disadvantaging the unfortunate patients who would have sought medical assistance.

Musadamba *et al* (2012) further noted that, some of the health institutions that had no standby generators, had their drugs affected which is against the Public Health Act Chapter 15:09 which states that “cold chain” drugs should always be kept under very cold temperatures as they are delicate in case of them being exposed to heat. They lose their potency when exposed to unfavourable temperatures hence they become a natural hazard to people’s health. Examples of such drugs which should maintain the cold chain are Anti-Tetanus Toxoid, Anti-rabies Vaccine which easily lose their potency if not kept refrigerated yet they are given in critical, life-saving situation like dog bites where failure to contain rabies may lead to deaths, psychosis and even serious wound infection. Moyo (2013) contends that African nations are the most affected in load shedding. Zhou (2013) argues that the political environment in most African nations could be the significant reason for load shedding. Moyo (2013) advocated for political will. Shumba (2014) acknowledged that Zimbabwe’s electricity crisis continues to worsen as load shedding has become the order of the day with most key industries that includes health, mining, agriculture and tourism being negatively affected. Zimbabwe generated 1,300 megawatts of electricity which was way short of daily national requirements of about 2,200 megawatts (Matimire, 2014). Matimire (2014) noted that the national electricity provider estimates to generate 6, 200 megawatts in the next decade to sufficiently power the economy but due to organisational politics meddling within the organisation, the challenge may remain a tall order. There could be various reasons for the down surge of supply of electrical power such as the effects of the crumbling economy due to the changing landscape of the government’s political environment, the changing land redistribution policies that has driven away potential investors, the changing laws on company ownership and acquisitions and the prevailing deteriorating investment climate in the country, corruption, skills shortage and poor planning (Moyo, 2013).

5.6 Major legislation in Public health in Zimbabwe

The Public Health Act of Zimbabwe 19 of 1924, chapter 15:09 promotes health to the general public. The act prohibits unethical practices that might have been exercised by some health institutions. Medical, Dental and Allied Professions Act Chapter 27:08 does not allow health institutions to use expired drugs, and the act further states that when such health institutions are caught in such a melee, they risk losing their licence as such untoward behaviour is tantamount to infringement of the fundamental right of individuals to quality health. The Dangerous Drugs Act Chapter 15:02 has also some provisions in regulating the use of such drugs. (Musadamba *et al*, 2013). In fact, they are not supposed to be kept outside the refrigeration and used to human beings. The acts compel such health institutions to destroy drugs that have not been properly handled (especially those that could not have been in the refrigeration).

VI. Research methodology

6.1 This study used the **Mixed methodology approach** to carry out this research. Neuman (2011) views mixed methods research as a methodology for conducting research that involves collecting, analysing and integrating quantitative (e.g., experiments, surveys) and qualitative (e.g., focus groups, interviews) research. This approach to research is used when this integration provides a better understanding of the research problem than either of each alone. Neuman (2011) argues that by **mixing both quantitative and qualitative** methods, the researcher gains in breadth and depth of understanding and corroboration, while offsetting the weaknesses inherent to using each approach by itself. One of the most advantageous characteristics of conducting mixed methods research is the possibility of triangulation, i.e., the use of several means (methods, data sources and researchers) to examine the same phenomenon. Triangulation allows one to identify aspects of a phenomenon more accurately by approaching it from different vantage points using different methods and techniques. Successful triangulation requires careful analysis of the type of information provided by each method, including its strengths and weaknesses (Criswell, 1988).

6.2 Research design

The design for this study was the **descriptive survey research design**. The survey design was chosen as a research technique in this study to investigate the impact of current ZESA's electricity supply power shortage on health service delivery rather than on the basis of historical data. The argument for choosing survey has been based on that, survey provides a quick, efficient and accurate means of assessing information about the population (Choga and Njaya, 2011). Also it is more appropriate where there is lack of secondary data (Kothari, 2004) like for this research study. Surveys can be divided into two broad categories, the questionnaire and the interview (www.socialresearchmethods.net, accessed on 26/02/2016)

6.3 Research subjects

6.3.1 Population

The population of the study was constituted by two hundred (200) nurses, technical staff like eighteen (18) radiographers, sixty (60) patients who had been under medical treatment for at least a month or hospitalised for such a period, twelve (12) administrators, forty (40) doctors, fifteen (15) Ministry of Health Officials and ten (10) ZESA senior officials. The total target population size was therefore 355 from which the sample was drawn in line with Khothari (2004) sentiments.

6.3.2 Sampling procedure

Two methods were used to identify respondents and participants. These were;

- (i) **Stratified sampling technique** that was used to come up with respondents who answered the questionnaire. The method is a probability technique but it's very ideal for this study since it is based on proportional representativeness and respondents for each stratum (category) are selected on the basis of random sampling. This technique reduced bias in the selection of respondents (Choga and Njaya, 2011). The justification of considering this sampling method according to Leedy (1989) supported by Johnson and Joslyn (1991), was to have a procedure that ensured that all key stakeholders were accommodated on a proportional basis to get a holistic overview of the research problem and allowing objectivity in the selection of respondents.
- (ii) **Convenient sampling technique** is a subjective technique based on the researcher's opinion to identify subjects on the basis of their convenient accessibility and proximity to the researcher (Creswell, 2003) supported by Kothari (2004) and www.explorables.com, (accessed on 04 April, 2016). The number of participants was based on the data saturation technique which required the researchers (interviewers) to stop probing others once they realised that there was hardly any other new information coming.

6.4 Research instruments

The research tools used were a structured questionnaire and an unstructured interview guide. This triangulation approach was meant to avoid prejudices, bias and halo effect by balancing the two instead of one in order to be more objective (Kothari,2004). The questionnaire was crafted based on the research objectives and the Interview guide based on research questions shown earlier on as III and IV respectively.

Table 1: Summary of the target sample subjects, composition, sampling techniques and research instruments

Category of subjects	Sampling technique	Sample size	Instrument/Method of data collection
Nurses	Stratified	45	structured questionnaire
Technical staff e.g. radiographers	Stratified	8	structured questionnaire
Patients	Stratified	41	structured questionnaire
Administrators	Purposive/Convenience	6	unstructured interview
Doctors	Purposive/Convenience	4	unstructured interview
Ministry of Health senior officials	Purposive/Convenience	3	unstructured interview
ZESA senior officials	Purposive/Convenience	4	unstructured interview
Health experts/consultants	Purposive/Convenience	4	unstructured interview

6.5 Ethical and legal considerations

Ethical principles (guidelines) guided, informed and protected the researchers as well as the participants. The following virtues were considered by the researchers (Neuman, 2011).

- (i) Confidentiality
- (ii) Anonymity on the part of respondents
- (iii) Informed consent
- (iv) The right to privacy of participants

6.6 Data presentation, analysis and interpretation procedure

For the structured **questionnaire**, data presentation and analysis used descriptive statistics after the application of a quantitative software package that was used to collate and summarise data, SPSS. For quantitative research, descriptive statistics is usually used (Kothari, 2004 and Bless and Higson-Smith, 1999 supported by Njaya and

Choga, 2011). This suited this research well. For the **Interviews** data was analysed on the basis of Content analysis and some narrative statements (Weitzman, 2000)

VII. Results

7.1 Gender composition of respondents

Table 2: Gender composition

Gender (Sex)	Absolute frequency	Relative frequency
Male	54	54
Female	43	46
Total	94	100

There were slightly more males than females in this study which showed that there was gender balance

7.2 Education level of respondents

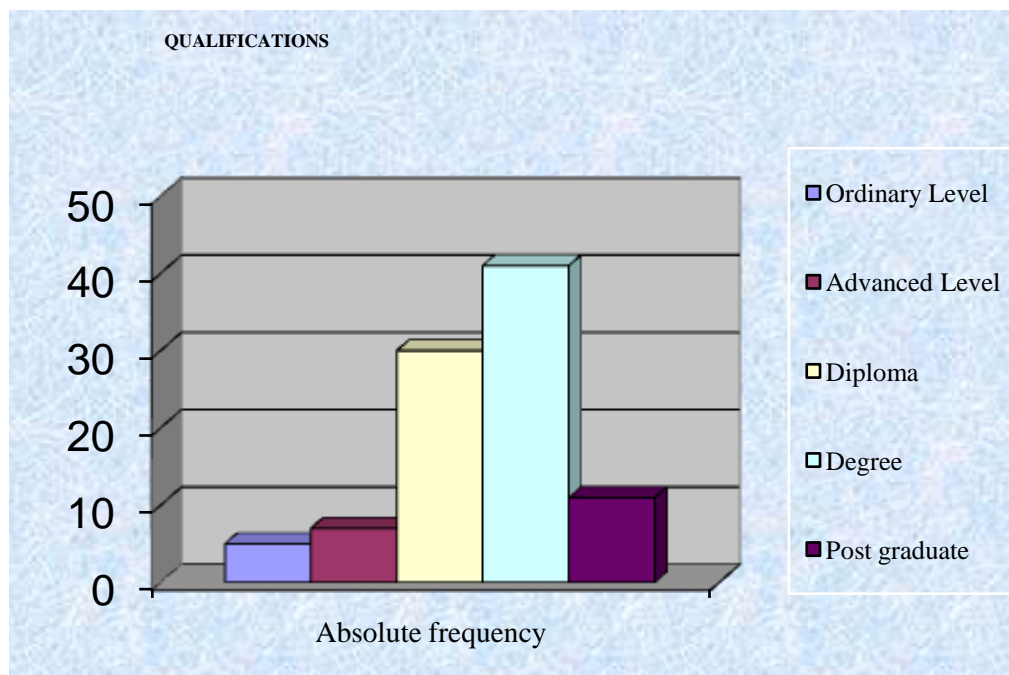


Fig 2: Education level of respondents

Majority of respondents had attained tertiary education and should have been comfortable with completing the questionnaire.

7.3 Comment on the impact of power shortages on surgical operations.

Table 3: Comments on impact of power shortage on surgical operations

Comment	Strongly agree		Agree		Not sure		Disagree		Strongly disagree		Totals	
	f	%	f	%	f	%	f	%	f	%	f	%
Delays could lead to complications	84	89	8	9	2	2	0	0	0	0	94	100
Delays could cause death especially of patients in ICU	90	96	3	3	1	1	0	0	0	0	94	100
Very risk if there is power cut after patient attended by anaesthetic.	90	96	4	4	0	0	0	0	0	0	94	100
Difficult to reschedule an operation due to shortage of doctors or specialists	80	85	12	13	2	2	0	0	0	0	94	100
More expenses due to use of generator	70	74	20	21	4	5	0	0	0	0	94	100
Postponement of operation results in patient losing confidence	1	1	3	3	1	1	39	41	50	54	94	100
Complications or death usually result in legal suit by relatives	12	13	60	64	5	5	13	14	4	4	94	100

The results showed overwhelming response about the adverse effects of power cuts during or in the process of conducting surgical operations. Power cuts usually resulted in complications, which resulted in further deterioration of the patient's health or even death, especially those under life supporting system (oxygen)

under intensive care attention. Due to shortage of doctors especially specialists, it was difficult to reschedule operations due to huge backlog of other patients needing medical attention. Of concern was the indication that there were cases of litigation perpetrated by spouses or relatives of the deceased in the event of death or complications arising especially from power shortages. Moyo (2013) and Chanda (2014) warned that the government is likely to be taken to the courts of law by angry relatives in the event of any complications experienced due to power cuts.

7.4 Effect of power shortage on drug refrigeration

Table 4: Effect of power shortage on drug refrigeration

Comment	Strongly agree		Agree		Not sure		Disagree		Strongly disagree	
	f	%	f	%	f	%	f	%	F	%
Lack of proper refrigeration could cause some drugs to be irrelevant.	50	53	36	38	6	7	2	2	0	0
Lack of refrigeration affects drug shelf life (quick expiry)	40	42	45	48	5	6	2	2	2	2
Great loss as some drugs will be thrown out once certain temperature levels are not maintained	60	64	28	30	4	4	1	1	1	1

The results showed that power cuts caused some medical drugs to become less effective, decrease drugs shelf life and losses as some drugs were sensitive to temperature such that any heat or otherwise renders them irrelevant and automatically become a wastage. Such drugs include diabetes drugs like insulin, tetanus toxoid (ATT), anti-rabies vaccine. Chanda (2014) provided some measures that could be taken in maintaining the refrigerators in the event of power cut. He further argues that such drugs could not be used, and pointed out that there will be need to consult with the authorities in the Ministry of Health.

7.5 Power shortage effects on maternity services

Table 5: Power shortage effects on maternity services

Conditions	Strongly agree		Agree		Not sure		Disagree		Strongly disagree		Totals	
	F	%	f	%	f	%	f	%	f	%	f	%
Delays in taking scans, tests, x-rays	70	75	21	22	2	2	1	1	0	0	94	100
Absence of results may tempt doctor to use personal judgement which can be risk	50	53	37	39	5	6	2	2	0	0	94	100
Complications can arise as mutual ointment would not have been diagnosed	60	64	30	32	2	2	2	2	0	0	94	100
Lack of services delivery may result in loss of confidence and patient taken elsewhere by relatives thereby losing patients or customers	50	53	40	43	2	2	2	2	0	0	94	100

Usually pregnant mothers may have their treatment or consultation delayed. Absence of results at times may contribute to doctors making costly miscalculated decisions based on personal judgement resulting in complications. Chanda (2014) stated that the power is needed to those patients in the maternity wards for lighting, and carrying out other activities that need light. Frank (2012) also observed that those mothers, who may need to be operated, are likely to be affected. Jackie (2008) argues that failure to carry out such an operation to mothers with complication in pregnancy is likely to put both the mother and the baby at risk.

7.6 Other effects on maternity services raised by respondents.

Table 6: other effects

Effect	Possible Frequency	Actual Frequency	%
Causes delays in conducting examinations	94	70	74
Some patients are turned away and not attended	94	69	73
Loss of confidence by public on health institutions	94	50	53
Delay's in attending hypertension pregnant women could result in death of mother, child or both	94	45	48

Serious consequences could arise if there was a power shortage, such as loss of life to the mother, baby or both. In some cases, pregnant women were not attended to and turned away culminating in loss of confidence

in the health delivery system. Chanda (2014) also argues that continuous turning away patients that could not get the health services due to power cut result in people losing confidence with such health institutions. Jackie (2008) advocated for some alternatives to ensure that the health service delivery is not compromised. Moyo (2013) recommends that health institutions need to maintain their reputation and install confidence to their patients. Frank (2012) argues that losing one patients means a lot.

7.7 Challenges of power shortage on health delivery system

Table 7: challenges of power shortage on health delivery system

Challenges	Strongly agree		Agree		Not sure		Disagree		Strongly disagree	
	Actual	%	Actual	%	Actual	%	Actual	%	Actual	%
Delays decision making even in critical conditions	45	48	40	43	3	3	2	2	4	4
Resorting to generators is costly and inconveniencing	20	21	40	43	8	9	12	13	14	14
Transfer of patients to other services providers can be expensive and inconveniencing	15	16	35	37	10	11	19	20	15	16
Increased customer complaints and even loss of customers	30	32	55	59	3	3	4	4	2	2
Increased legal suits in the event of unfortunate complications or deaths	35	37	45	48	8	9	4	4	2	2
Long queues at times as service become slow especially data capturing	40	43	49	52	3	3	1	1	1	1
Unfortunate deaths which could have been avoided	55	59	36	38	2	2	1	1	0	0
Can result in temporary closure of certain units or departments	15	16	55	58	10	11	8	9	6	6

There was overwhelmingly response on most challenges that they were seriously affecting health service delivery. Some of the major areas of concern included delays in decision-making for emerging (critical) cases, loss of clientele, long queues as processing of certain documentation and examination was delayed. In extreme cases, also death occurred if there was power supply. Frank (2012) was against the health institutions that are not maintaining their clientele and warned them that losing one patients means a lot in business. Chanda (2014) argues that decisions should be quickly made in health institutions in order to avoid complications and deaths.

7.8 Any other challenges by respondents on health service delivery.

Table 8: other challenges cited by respondents on health service delivery

Other challenges	Possible Frequency	Actual Frequency	%
Damage to hospital equipment	94	60	64
Affecting sterilisation of sharp instruments/tools	94	71	76
Delayed and substandard services delivery	94	52	55

In addition to the adverse impact of power shortages on health service delivery, the respondents emphasised the failure to sterilise sharp instruments, damage to hospital equipment and machinery. Above all services delivery in a number of situations was still a mammoth task or tall order. Chanda (2014) warned on the use of unsterilized instruments and suggested that the health institutions need to consult the authorities in the Ministry of Health. Various authorities have concurred with the respondents. Authors such as Muchadema *et al* (2012) found out that Chinhoyi hospital experienced power shortage that damaged some hospital equipment such as one X-ray machine and one ultrasound scanning machine. Frank (2012) also noted that in Japan, some of the hospital equipment was damaged; hence the government had to pump up money in order to repair such equipment.

VIII. Findings

These were obtained from unstructured interviews conducted. The summative comments were based on each interview question and put in thematic form with few narrative statements in some cases;

8.1 Frequency of power cuts or load shedding on the operations of their institutions and health service centre.

The responses from the three doctors and other two health experts indicated that they experienced frequent power cuts and that affected their operations. They further stated that the way the power

was restored, had the potential to damage some of their equipment. When the ZESA officials were asked, they tried to cover up their problems. They indicated that health institutions had not been affected much by the powercuts as they were usually spared from load shedding.

8.2 Effects of electricity power shortage on the effective conducting of surgical operations.

The responses that were recorded indicated that the shortage of power supply also seriously affected surgical operations. Those from the health sector such as the doctors and health experts, they indicated that sometimes some of the surgical operations were to be postponed and that posed high risk to the patients. Frank (2012) found that some operations could be delayed; hence may cause fatality and complications to patients. The two ZESA officials had no much information on how the surgical operations could be affected. They ended up stating that, the surgical operations are likely to be affected in the event that there is shortage of power supply. They were trying to respond in a way of protecting their sector.

8.3 The challenges of electricity shortage on the drug storage.

The responses given by the doctors, health experts and ZESA officials were the same like those in the questionnaires. They all highlighted the effects of shortage of power supply on the drug storage.

One Health expert actually said

'health institutions are likely to make a loss as they will be compelled to dispose all the drugs that could have been affected''.

8.4 Effect of power shortage on maternity services

Almost all the participants said that the maternity activities are usually affected to a large extent including the ZESA officials. They indicated that, during the labour, some complications could develop especially when the patient may need an operation but such activities could be affected.

One doctor had this to say

'during the winter season, the maternity wards would need electricity in order to warm up those who would have delivered''.

and the other Health expert said

'the pre-mature babies would also need to be put in incubators for some time, but due to shortage of power supply, such activities will be seriously affected.''

8.5 How power shortage affects the conducting of medical examinations such as x-rays, scans and other tests.

The doctors and health experts clearly stated that the x-rays and scans were seriously affected. They further stated that sometimes they turn away patients that would need health service delivery such as x-rays and scanning. In this case, losing one patient meant a lot in terms of customer (patient or client) confidence. The doctors and health experts were very much concerned about that issue. They further stated that, even the laboratories where blood samples were taken for examination, they would be seriously affected. Sometimes, the doctors ended up having results that were not reliable. They further stated that when the blood clot and the patient needed re-bleeding, the health institutions faced challenges where patients could not accept re-bleeding. It took more time for patients to understand such predicament. Furthermore, the responses given by the two ZESA officials indicated that, they acknowledge that there was a possibility of some kind of disturbances in the event of power shortage on medical examinations such as x-rays, scans and laboratory blood tests.

8.6 Other challenges that affected health service delivery.

These included cases of more deaths, complications, litigations and losing clients, as problems that could be attributed to power shortage in health institutions.

IX. Conclusion

Generally, electricity power shortage impacted adversely on conducting of surgical operations, drug storage (inventory), maternity services, medical examinations such as x-rays, scans and r tests. All this pointed to poor health service delivery and was a very serious problem that affected most health institutions in Zimbabwe

X. Recommendations

Based on the research results and findings, which were used to arrive at the above conclusions, this study recommends that;

10.1 Infrastructure development

Health institutions should have facilities such as generators and solar panels installed and government should enforce and monitor that they are availed. The availability of such facilities should enhance health service delivery and reduce cases of complications, postponement of services and even deaths.

10.2 Bringing other players by removing the monopoly enjoyed by ZESA

The government should open up the power industry such that even private players are invited to supply electricity power possibly at an affordable and regulated tariff unlike the current situation where ZESA enjoys monopoly. This monopoly is unhealthy for development as it encourages laxity and lack of creativity because of no competition, hence minimal innovation.

10.3 Amendments to the ZESA Act

All health institutions should be exempted from power cuts (load shedding). Government should ensure that the ZESA Act is amended to have that provision in order to safeguard the lives of people who face possible death as was established by this study owing to power shortage.

10.4 Government intervention

There is need for the government to intervene in resolving this problem of power cut in the country. The issues of good governance and leadership need to be sorted out. There is need to have leaders with vision who may be able to convince other nations in assisting with resources. Mobilisation of resources should not be focused on the Look East policy alone, but should be throughout the world. Therefore, there is need for the government to engage with the European and Western countries and build a very good relationship for the betterment of the country, Zimbabwe as a whole. Once the relationship is restored, the country is likely to get foreign currency that can be used to import more electricity power as well as maintaining the old generators at Hwange power station and Kariba.

References

- [1] Almansour, Y.M., (2012). The Relationship between Leadership Styles and Motivation of Managers Conceptual Framework. International Refereed Journal Vol.-111.
- [2] Bless, C and Higson-Smith, C (1999). Fundamentals of social research methodology, An African perspective, 2nd edition, Juta and Company Ltd.
- [3] Chanda, K. (2014). Health Policy and Systems Development, Zambia.
- [4] JChipunza, C., Samuel, M.O., & Mariri, T. (2011). Leadership Style, Employee Motivation and Commitment: Empirical Evidence from a Consolidated Retail Bank Operating in a Depressed Economy. African Journal of Business Management Vol. 5(20) pp. 8337-8346
- [5] Choga, F., and Njaya, T. (2011). Business research methods, 1st edition, ZOU, Harare
- [6] Cresswell, J.W, (2003) Research design, qualitative, quantitative and mixed methods approaches, second edition, Sage publications.
- [7] DailyNews, 12 September, 2015.
- [8] Dangerous Drugs Act Chapter 15:02, Zimbabwe.
- [9] Frank, H. (2012). Outages Suspended, But Conservation Critical, NBC 5, Dallas – Fort Worth
- [10] Denzin, N. K. & Lincoln, Y. S. (2007). Handbook of Qualitative Research. London: Sage Publications.
- [11] Herald3 October, 2015.
- [12] Keith, G. (2012). Rolling Electricity Blackouts Strike Edmonton and Across the Province. The Vancouver Sun: RSA.
- [13] Kennedy, P. (2009). How to combine multiple research methods, practical triangulation, Johny Holland.
- [14] Kothari, C.R. (2004). Research methodology, New Age International Ltd Publishers: New Dehli.
- [15] Jackie, R. (2008). India Faulted for Failure to Improve Power. The Wall Street Journal.
- [16] McGreal, C. (2008). The Shutting Down of Gold Mines in South Africa, RSA.
- [17] Medical, Dental and Allied Professions Act Chapter 27:08, Zimbabwe.
- [18] Ministry of Health, (1996). Demographic and Healthy Survey. Lusaka, Zambia. Central Statistics Office
- [19] Mlauzi, T. (2010). Department of Housing and Community Services: Municipality of Chinhoyi; Personal communication. Zambesia.
- [20] Moyo, G. (2012). The Decline of Zimbabwean Economy, Zambesia.
- [21] Muleya, P. (2013). Electrical Power in Zimbabwe: An Overview. Zambesia.
- [22] Muhlanga, G., and Ncube, T. (2003). Research Methods and Statistics MED Module, Zimbabwe Open University.
- [23] Musadamba, D; Kanyepe, M; Madiye, L, and Hove, T. (2012). The Effect of Load Shedding in Chinhoyi Urban Residential Areas, Zimbabwe: Downmore International Journal of Energy Engineering 2(5): 232-241 DOI: 10.5923/j.jjee.20120205.07.
- [24] Najibullar, F. (2008). Tajikistan: Energy Crises, Eurasia Net. Retrieved 29.09.2015.
- [25] Neuman, W. L. (2011). Social Research Methods: Qualitative and Quantitative Approaches, 7th Edition, Pearson.
- [26] Parry, K.W. (2003). Leadership Culture and Performance: A Case of the New Zealand Public Sector. Journal of Change Management, Vol.4, (99-376).
- [27] Pollock, S.E, and Duffy, M.E. (1986). The Health Related Hardiness Scale: Development and Psychometric Analysis. Nursing Research Vol. 39: 218-222
- [28] Public Health Act Chapter 15:09, Zimbabwe
- [29] Ricardo, R., & Wade, D. (2001). Corporate Performance Management: How to Build a Better Organization through Measurement Driven Strategies Alignment. Butterworth: Heinemann.
- [30] Weitzman, E. A. (2000). Software and Qualitative Research. Journal. pp.803-820.
- [31] Yukl, G. (2010). Leadership in Organisation. New Jersey. Pearson Education Inc.
- [32] UNDP (2010). Energizing Poverty Reduction. A Review of Energy-Poverty Nexus in Poverty Reduction Strategy Papers.
- [33] Zhou, P. (2013). How Load Shedding Affects Productivity, Zambesia, Zimbabwe.
- [34] www.socialresearchmethods.net/, (accessed on 26/02/2016).
- [35] www.explorables.com/, (accessed on 04/04/2016).