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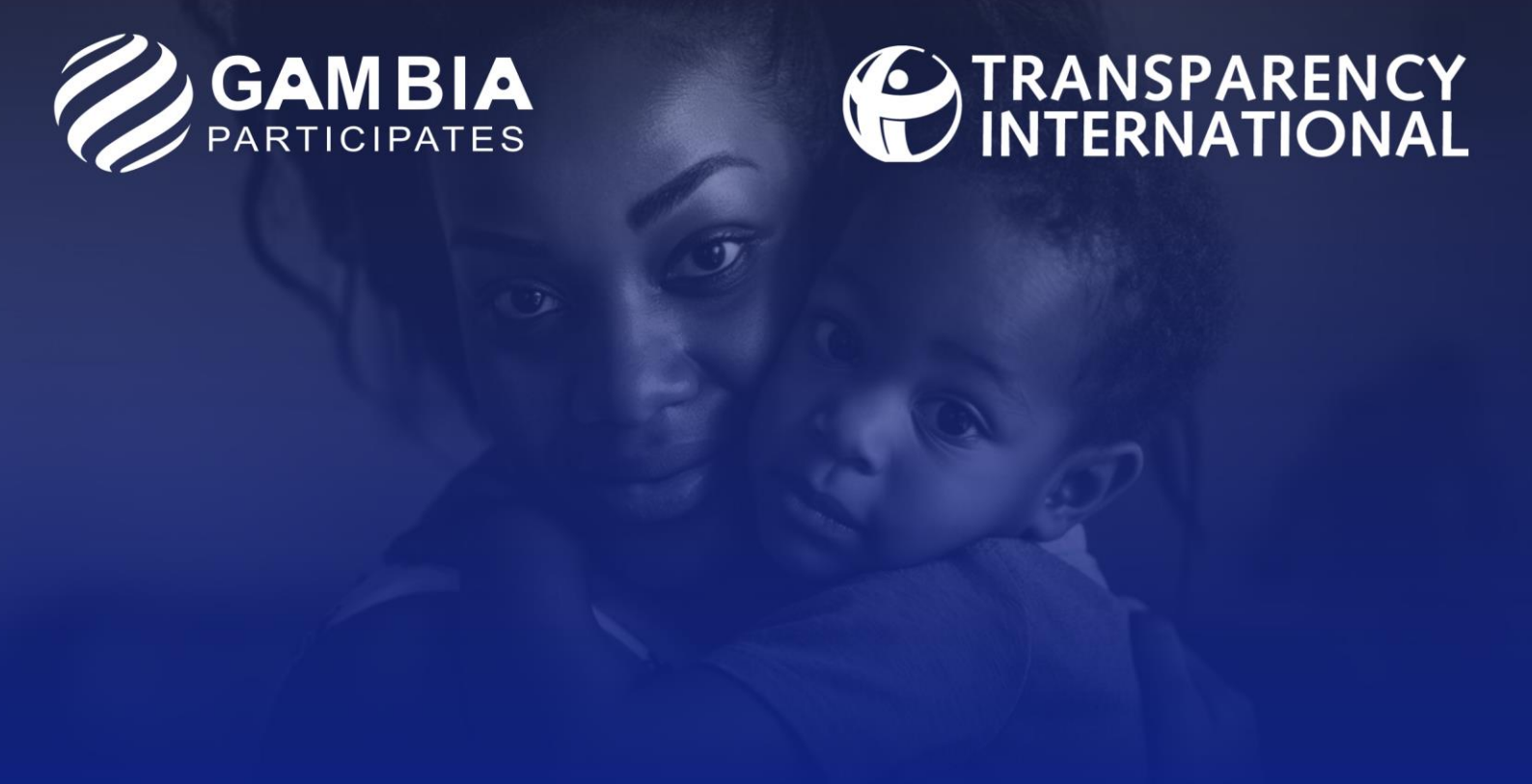


LINKING MATERNAL MORTALITY TO ELECTRICITY POWER OUTAGES IN THE GAMBIA

SURVEY REPORT

March, 2024

Maternal Mortality Due to Power Outages In The Gambia

Contents

Introduction

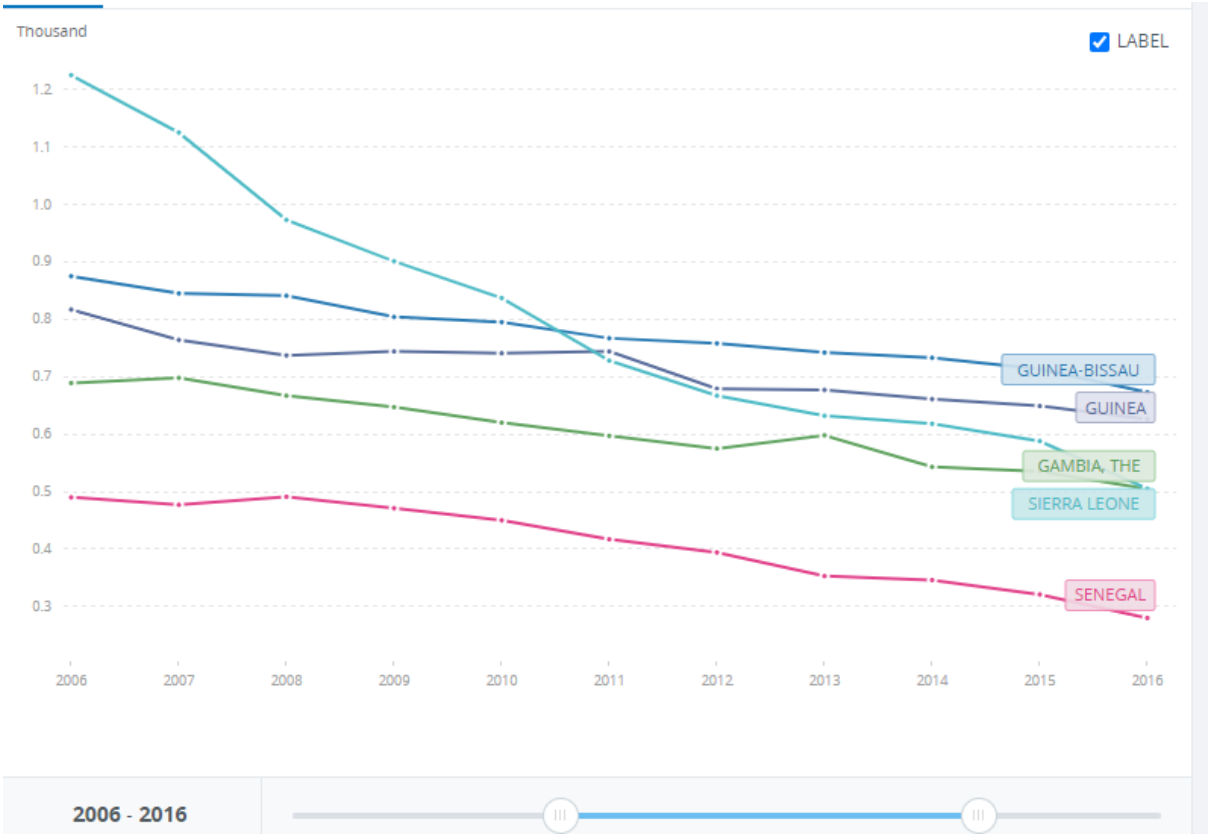
For nearly five decades, Gambians have had to endure all too common voltage brownouts and power outages. Electricity has been and is still a key challenge in terms of both quality and access. The existing power infrastructure in The Gambia is dilapidated and urgently needs modernising and refurbishing. Voltage fluctuation, spikes, blackouts, brownouts, and other disruptions have obsessed economic progression and affected industries, businesses, and citizens. The continued dependence on imported fuel for generating electricity is also taking its toll on the wider economy. In short, the energy system has become a burden on the Gambian economy and society – part of the problem of development rather than the solution. The status quo is unsustainable.

The National Water and Electricity Company (NAWEC) is the state-owned company with the rights to provide electricity, water, and sanitation in the Gambia. It presently serves about 249,678 electricity customers (of which more than 95 percent in the Greater Banjul area - GBA), and 100,000 water customers and 100,000 sewerage customers, all in GBA (Pura Annual Report 2021). With the continued population growth, NAWEC has been unable to meet the growing demand of water and electricity services, particularly from a striving tourism industry. The high level of inefficiency and ineffectiveness of NAWEC goes way back as early as the 2000s, six years into Jammeh's administration. Amongst the major reasons for these were misappropriation of funds, inappropriate deals and contracts awarded and poor governance (Foroyaa Newspaper May 31, 2018) (IMF Country Report No. 17/179). As a result, NAWEC electricity operations have been characterised by a chronic capacity shortage, and a resulting unreliable standard of service due to daily load shedding and network overloading. Technical losses are high, estimated at about 25 percent (World Bank Report No; PAD1375.

The unreliable standard service of NAWEC has negatively affected the lives of people both directly and indirectly. Even with erratic water and electricity supply, consumers pay a high cost for power in The Gambia – the average tariff of $0.23/kilowatt hour (kWh) is one of the highest in the sub-region. This is a result of high costs to produce and supply electricity, driven by expensive imports of Heavy Fuel Oil (HFO) for NAWEC's generators. Despite the high tariff, NAWEC is still unable to provide reliable electricity supply and it continues to be unable to cover its basic costs of operations, let alone major investments for expansion, the government had to bailout out NAWEC to finance its debt. Revenues are depressed as a result of losses, collection challenges, and, until recently, public institutions and street lighting have unsettled arrears with NAWEC.

Maternal Mortality Context in The Gambia and the Sub-region

Between 2006 and 2016, The Gambia has a lower maternal mortality rate compared to Sierra Leone, Guinea Conakry and Guinea Bissau.



Maternal mortality ratio (Senegal, Gambia, Sierra Leone, Guinea and Guinea Bissau) - World Bank

Maternal Mortality remains a key issue affecting women of reproductive age across the sub region and Africa at large. Sub-Saharan Africa registered 50% of all maternal mortalities in 2005 (BMJ Public Health, 2023). Despite the global decline in the maternal mortality ratio (MMR) to 34.2% between 2000 and 2020, MMR is still prevalent in Africa. In the 2013 population census, MMR was estimated at 433 out of 100,000 live births (lbs). The Gambia's SDG target on MMR is also based on these figures. However, the Medical Research Council – The Gambia (MRC Gambia) research on MMR suggests otherwise. MRC reported that pregnancy-related mortality ratio in The Gambia (2012) was at 861 out of 100,000 lbs.

From MRC's report, rural Gambia records more than half of all pregnancy related deaths in The Gambia. In addition to other underlining health and social factors, this could potentially be associated with poor medical infrastructure and erratic electricity supply in rural Gambia.

Possible Causes of NAWEC's Low Capacity, Inefficiency and Ineffectiveness Between 2006 and 2016

- **High Cost of Fuel**

NAWEC has always had to depend on the external market to acquire fuel for its electricity generation; however, this has never been cheap as it is one commodity that is very expensive, especially for The Gambia. For instance, in 2008, NAWEC expended about 6.7 million US Dollars to acquire just 15,000 metric tons of Heavy Fuel Oil. Furthermore, in 2007, while

NAWEC spent a total sum of D 880 million on fuel, lubricants and energy, it spent D 1.3 billion due to increase in fuel prices, thus illustrating an increment of 48% (The Point Newspaper, 2011). The rising cost of fuel must have lowered the company's production capacity.

- **Poor Maintenance and Usage of Old Generators**

NAWEC's persistent use of generators that have exceeded their valuable lifespan coupled with poor maintenance of generators has led to several engine failures. Consequently, actual electricity production never reaches potential electricity production. For example, in 2007, NAWEC's Brikama Power Station generated 157 GWh which decreased by 11% to 141 GWh in 2008 due to certain engines going out of service (The Point Newspaper, 2011). In its 2017 report on NAWEC's performance in generating, transmitting and distributing electricity, the National Audit Office (NAO) of The Gambia shows, NAWEC's main power station in the Greater Banjul Area (Kotu Power Station), at end 2014, had 8 generators (2 were commissioned in 1981, 2 in 1990 and 1997, 3 in 2001, and 1 in 2009). However, only 5 generators were operational as the other 3 were out of service, and NAWEC's electricity production capacity declined by 12.8 megawatts (National Audit Office, 2019).

- **Poor Transmission and Distribution System**

The state-owned enterprise between 2006 and 2016 had a dispatch system which was not up to capacity as well as obsolete network components which rendered its transmission and distribution system powerless in Greater Banjul Area, where electricity consumption was highest (The Point Newspaper, 2011). Such a combination leads to inefficiency and ineffectiveness in transmitting and distributing electricity.

- **Non-payment of NAWEC Bills**

Between 2006 and 2016, the public corporation registered a lot of unpaid bills, thus increasing the amount of debt owed to NAWEC. This was comprised of both private and public sector consumers of electricity. Surprisingly, the central and local governments, combined, were among the major defaulters on paying NAWEC bills. In its 2008 annual report and financial statement, NAWEC was owed D150 million by different economic actors. However, D105 million (70%) of that amount was owed by the government (local and central governments combined) (The Point Newspaper, 2011). By the end of February 2014, the City Council of Banjul (BCC), alone, had owed NAWEC D 31 million (The Point Newspaper, 2014).

- **Extremely Poor Fiscal Space**

NAWEC's fiscal performance between 2006 and 2016 was very poor as its payables were mainly greater than its receivables, causing it to accumulate unsustainable amounts of debt. To instantiate this, according to NAWEC's 2016 audit report by an independent audit firm called DT Associates, the state enterprise received a net total of D 803.7 million while making a total net payment of D 862.3 million and thus incurring a deficit of D58.6 million at end 2016. The cumulative losses incurred by NAWEC, however, at end 2016 stood at D 5.7 billion, which increased from D 4 billion at end 2015. Additionally, NAWEC's borrowing as at end 2016 stood at D 8.8 billion (DT Associates, 2020). This would later increase to D 9 billion in 2017 (Standard Newspaper, 2017). Clearly, NAWEC is an extremely expensive company to run due to its incremental yet exorbitant costs of operation. For instance, in 2012, 2013 and 2014, NAWEC spent D 1.7 billion, D 1.9 billion and D 2.3 billion, respectively, to generate, transmit and distribute electricity only in the Greater Banjul Area of The Gambia, which equals a total

of D 5.9 billion just within 3 years (National Audit Office, 2019). A business that has a huge cost of operation, barely generates positive returns and accrues a lot of debt is obviously bound to perform at low capacity.

Corruption and Mismanagement Could Possibly be Linked to NAWEC's Electricity Outage

NAWEC is one of the public enterprises in The Gambia that has been experiencing fraud and corruption (Enrst & Young LLP, 2019) which have effect in providing reliable power supply to the public. Despite several project interventions at NAWEC to make electricity and water distribution more reliable, citizens continue to experience erratic power and water supply. In March 2021, D15.5 million was stolen from NAWEC's AGIB Bank's account (Fatu Network, 2021) through forging NAWEC's signatures and document stamps. 88% of NAWECs revenue is generated from the purchase of electricity (Enrst & Young LLP, 2019) which is done through the system of cash power sales. In 2018, 29 staff of NAWEC were reportedly sacked for cash power fraud at different NAWEC Cash Power selling points (The Standard, 2018).

In 2022, NAWEC received a grant of $40.2m to increase transmission and meet the increasing urban electricity and water demand ahead of the Organization of Islamic Cooperation (OIC) Summit in Banjul. NAWEC confirmed that they have fully completed the OIC funded project. However, on May 1, 2024, 3 days ahead of the OIC Summit in Banjul, NAWEC published a power loadshedding roaster to provide adequate electricity supply to hotels and other accommodations where OIC delegates were hosted.

Despite NAWEC's potential to position itself financially, the company's total debt increased by 256% which is D9.1b, representing 82% of the company's liabilities between 2010-2017 (Enrst & Young LLP, 2019).

Enrst & Young LLP also reported in their audit report that a total of D42m was expended on the maintenance of G2 and G4 generators, which includes the purchase of spare parts. However, NAWEC could not provide the delivery confirmation of the said spare parts or details of the transaction. This could suggest that either the prices of the spare parts were overstated, or the monies were expended without receiving all the required spare parts.

It was established that NAWEC is unable to meet its day-to-day obligations. For example, GNPC, the state's petroleum company, supplies fuel to NAWEC for the continuous operation of their generators to distribute electricity. NAWEC should pay GNPC a weekly amount of D5m, but NAWEC stated that GNPC is paid its due funds when funds are available.

Corruption and mismanagement could potentially weaken NAWEC's ability to provide reliable and an uninterrupted electricity service to citizens, businesses and most importantly health center. Erratic power supply could pose severe danger to patients undergoing surgery, C-sections, and other medical operations that is reliant to electricity.

1. Survey objectives

There have been devasting impacts of power outages that are not often spoken of among which is the death of women during C-section. Caesareans and other surgeries have been performed by candlelight particularly in rural areas, premature infants have died without access to an incubator, life-saving vaccines have gotten destroyed due to inadequate refrigeration facilities.

Hospitals and medical clinics have and continue to struggle to meet their patient's most basic needs due to unreliable electricity and constant power outages.

The specific objective of the survey is to find out the number of women, children and men who died - during birth, after birth and during surgeries - in hospitals/clinics/health centres or at home because of NAWEC power outage across the country between 2006 and 2016.

2. Implementation

Using population proportionate sampling, the survey was carried out in over 230 households across the country. However, only 161 household data were recorded. This is because either some households did not know about 75% of the salient questions asked to them or they did not know anyone who had suffered any sort of maternal mortality. To provide a more accurate and balanced analysis/reporting, the project intended to interview some health personnel in hospitals/clinics/health centres, but they declined under the pretext of having to obtain an almost unobtainable permission letter from the Directorate of Health Services at the Ministry of Health. Gambia Participates, despite making all efforts, was unable to obtain the permit.

3. Survey structure

The survey questionnaire for households was divided into 3 sections

a. **Section 1:** Interviewer details. This section contains information about the interviewer and area/region where the interview was been conducted in.

b. **Section 2:** General respondent information. This section contains bio information about the respondent and his/her knowledge of NAWEC electricity supply in their area.

c. **Section 3.** Death Rate. This section contains information about respondent's knowledge of the number of men, women and children who died in hospitals/clinics/health centres because of NAWEC power outage across the country between 2006 and 2016

Before the field data collection began, training was provided to four enumerators/data collectors including two Gambia Participates staff on how to use KoboToolBox (as it was the platform used to collect the survey data) as well as on the importance of quality data.

4. Survey Findings

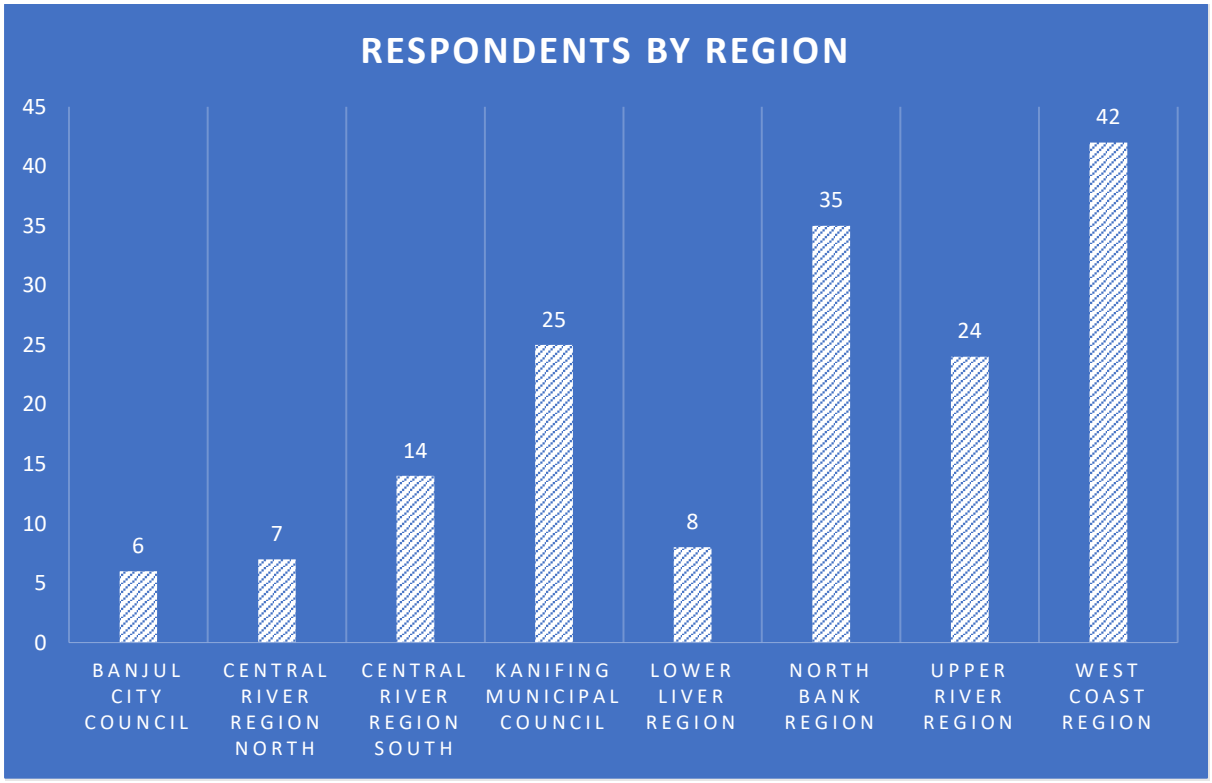
After collecting the data in Kobo, the data files were exported and downloaded using excel for quick analysis. The following were the findings.

5.2.2 Region of Respondents

Region Of Respondent	# Of Respondent	% Of Respondent
Banjul City Council	6	4%
Central River Region North	7	4%
Central River Region South	14	9%

Kanifing Municipal Council	25	16%
Lower Liver Region	8	5%
North Bank Region	35	22%
Upper River Region	24	15%
West Coast Region	42	26%
Grand Total	**161**	**100.00%**

The sampling methodology employed for the survey was Population Proportionate Sampling (PPS) and West Coast Region having the highest population in The Gambia takes 26% of the 161 respondents.

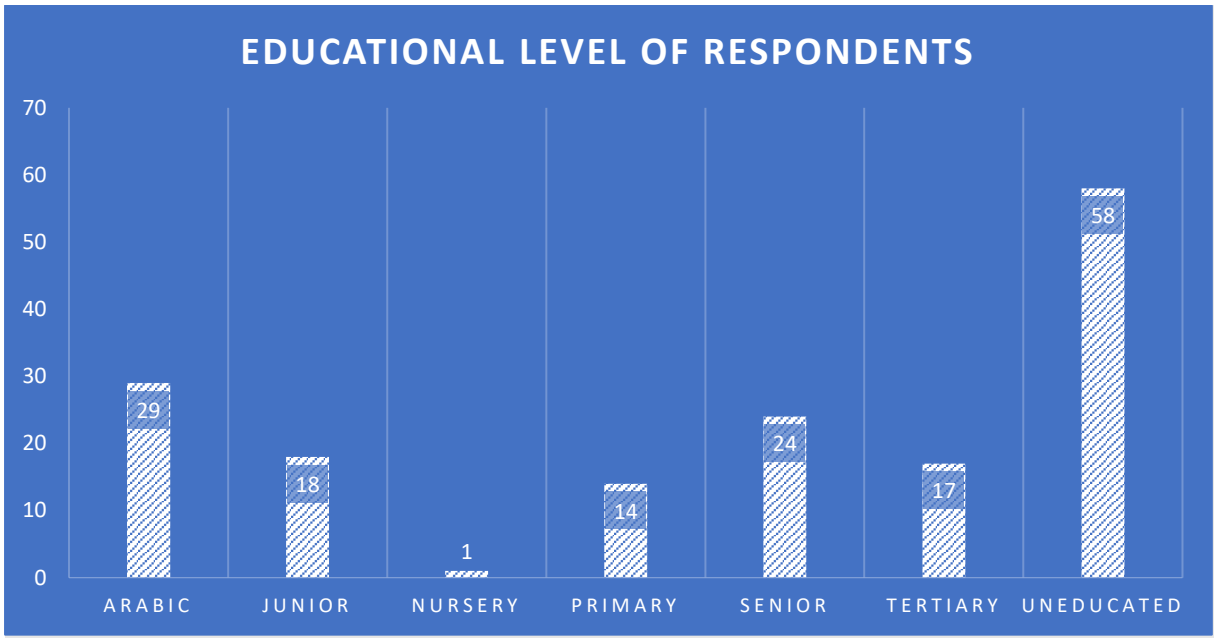


5.2.3 Level of Education of Respondent

Analysis of our respondents shows that 36% of our respondents are uneducated (they have no formal education including religious education). This was why our enumerators/data collectors were required to speak/understand various Gambian local languages.

Level Of Education	# Of Education Level	% Of Education Level
Arabic	29	18%
Junior	18	11%
Nursery	1	1%

Primary	14	9%
Senior	24	15%
Tertiary	17	11%
Uneducated	58	36%
Grand Total	**161**	**100.00%**



Region	No	% No	Yes	% Yes	Total	% Of Total
Banjul			6	5%	6	4%
Central River Region North (CRR_N)	3	6%	4	4%	7	4%
Central River Region North (CRR_S)	3	6%	11	10%	14	9%
Kanifing	2	4%	23	20%	25	16%
Lower River Region (LRR)	6	13%	2	2%	8	5%
North Bank Region (NBR)	17	36%	18	16%	35	22%
Upper River Region (URR)	10	21%	14	12%	24	15%
West Coast Region (WCR)	6	13%	36	32%	42	26%

Grand Total	**47**	100%	**114**	100%	**161**	100%

5.2.4 Did you have NAWEC electricity supply in your house/ area between 2006 and 2016?

When asked if they (respondents) had NAWEC electricity supply in their house/ area between 2006 and 2016, 114 respondents (that is 71%) of the 161 respondents answered YES. For the table above, one can notice that 57% of the respondents who answered yes are from the urban areas (West Coast Region, 32%, Kanifing M C, 20%, and Banjul , 5%) while the remainder of them are from the rural provinces.

5.2.5 Did you have Constant NAWEC electricity supply in your house/ area between 2006 and 2016?

Out of the 114 respondents that had NAWEC electricity supply in their house/ area between 2006 and 2016 only six (6) respondents (that is 5%) had constant NAWEC electricity supply in their house/ area between 2006 and 2016. This also means 95% of the 114 respondents had no constant supply of electricity between 2006 and 2016.

Region	N0	Yes	Total
Banjul)	6	0	6
Central River Region North (CRR_N)	4	0	4
Central River Region North (CRR_S)	11	0	11
Kanifing	23	0	23
Lower River Region (LRR)	2	0	2
North Bank Region (NBR)	16	2	18
Upper River Region (URR)	14	0	14
West Coast Region (WCR)	32	4	36
Grand Total	**108**	**6**	**114**

5.2.6 How often did you have NAWEC power outages in a day between 2006 and 2016?

Frequency	# Of Household	% Of Household
1--3 Times	54	50%

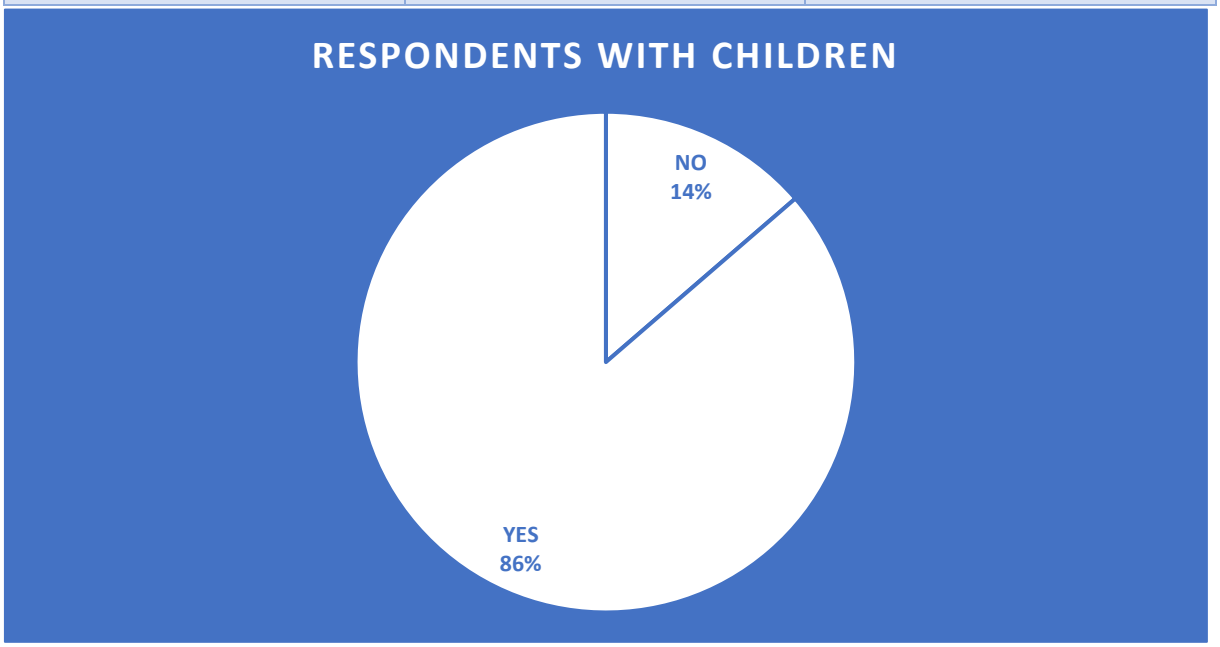
3--6 Times	27	25%
6--9 Times	17	16%
9--12 Times	9	8%
12 times and above	1	1%
Grand Total	**108**	**100.00%**

50% of the 108 respondents that did not have constant electricity between 2006 and 2016 experienced NAWEC power outages 1 to 3 times in a day either at their homes/households or within their area. While 25% experienced NAWEC power outages 3 to 6 times per day during the same period, the remaining 25% underwent NAWEC power outages more than 6 times per day.

5.2.7 Do you have a child or Children? Number of respondents with children

86% (139 out of 161) of the respondents had at least a child.

Children	# With Children	% With Children
NO	**22**	**14%**
YES	**139**	**86%**
Grand Total	**161**	**100.00%**



5.2.7.1 If yes how many male(s) and how many female(s)?

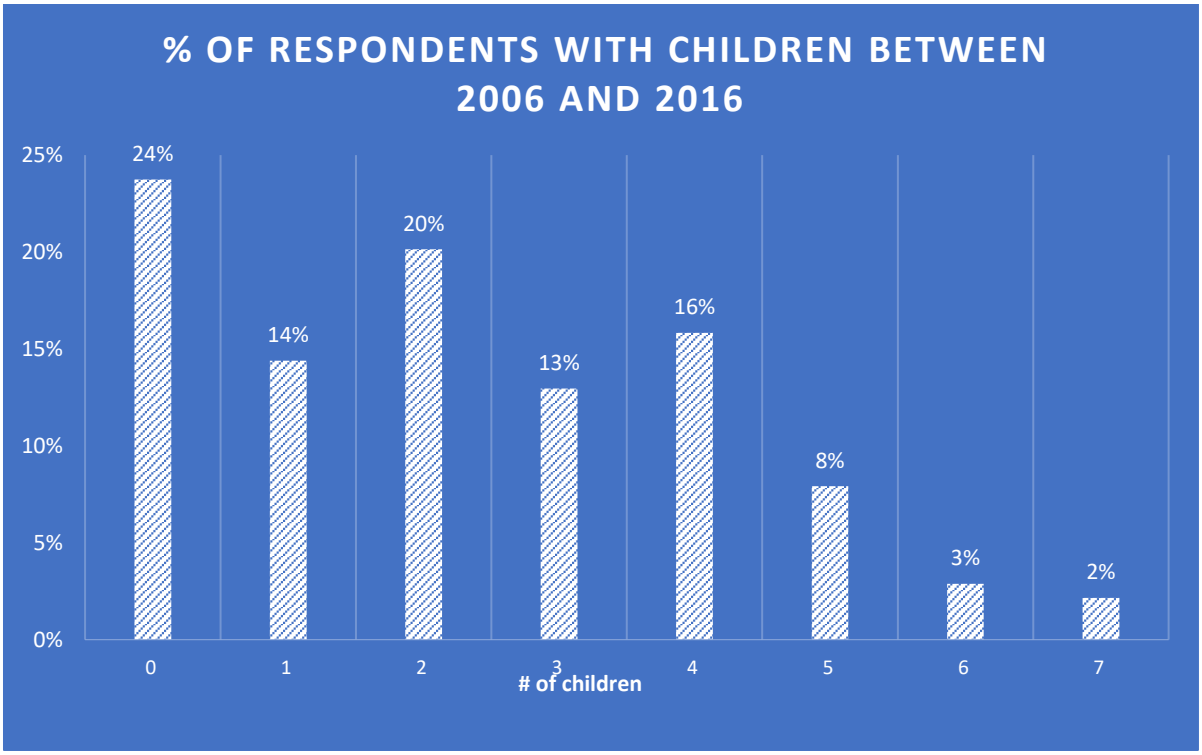
The table below shows that out of the 86% (139 out of 161) of our respondents who have at least a child; 8% (11 out of 139) respondents did not have a male child and 9% (13 out of 139) did not have a female child. One can also notice that 30% (42 out of 139) of the respondents had 2 male children and 25% (35 out of 139) had 2 female children.

# Of Children	# Of Respondents With Male	% Of Respondents With Male	# Of Respondents With Female	% Of Respondents With Female
0	11	8%	13	9%
1	30	22%	37	27%
2	42	30%	35	25%
3	25	18%	24	17%
4	16	12%	16	12%
5	10	7%	8	6%
6	1	1%	5	4%
7	4	3%	1	1%
Total	139	100%	139	100%

5.2.8 How many children do you have between 2006 and 2016?

24% (33 out of 139) of respondents did not have a child between 2006 and 2016 and 2% (3 out of 139) have 7 children each.

# Children	# of Respondents	% of Respondents
0	33	24%
1	20	14%
2	28	20%
3	18	13%
4	22	16%
5	11	8%
6	4	3%
7	3	2%
total	139	100%



Section 3 : Death Rate

5.3.1 & 5.3.2 Number of children given birth to in a health facility and home between 2006 and 2016

Between 2006 and 2016, 59 of the respondents said they did not give birth to a child in a health facility (clinic/hospital/health centre) and 123 said they have not given birth to a child t at home. 2 said they gave birth to 7 children in a health facility and none of the respondent gave birth to 7 children at home between 2006 and 2016.

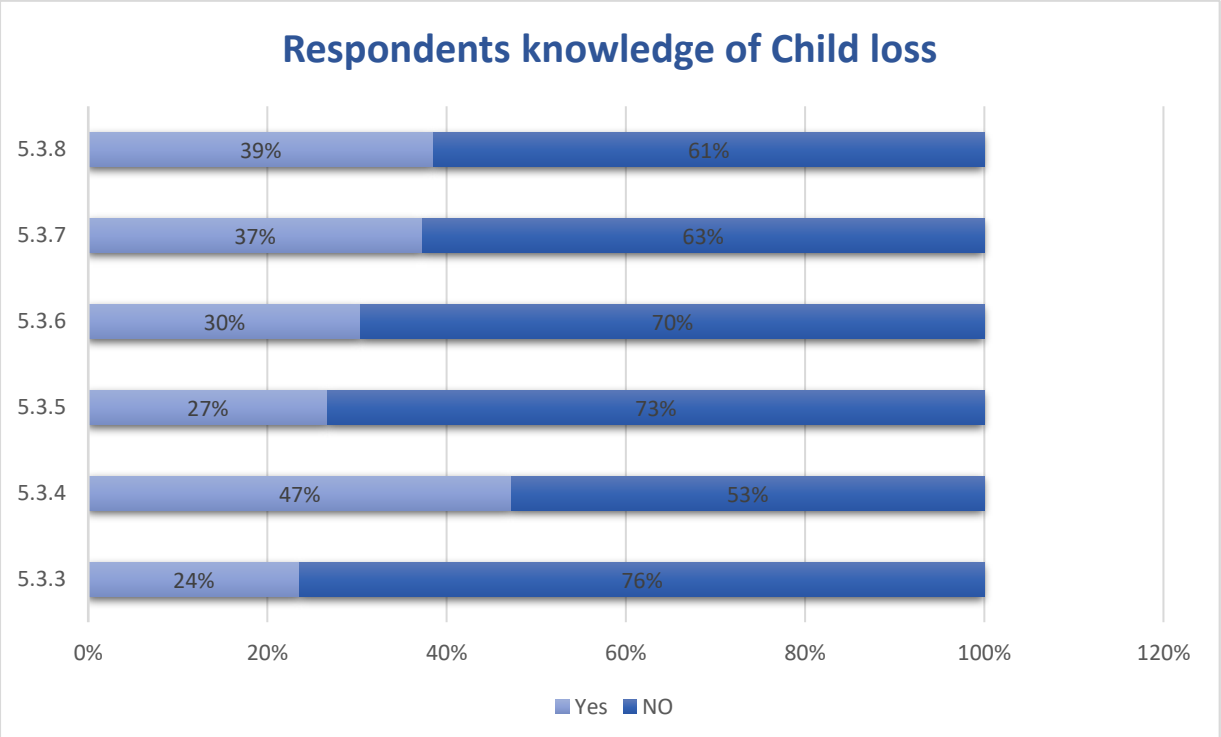
# Of Children	# Respondents Who Give Birth In Health Facility	# Respondents Who Give Birth In A Home
0	59	123
1	17	19
2	28	10
3	21	1
4	15	2
5	13	0
6	3	2
7	2	0
Total	158	157

Questions 5.3.3 to 5.3.8

The following questions were asked to respondents on a YES or NO basis, summary of their responses are summarised in the table below.

5.3.3 Did you/your partner lose a child during childbirth between 2006 and 2016?
5.3.4 Do you know any family member or anyone who lost a child during childbirth between 2006 and 2016?
5.3.5 Did you ever lose a child after childbirth between 2006 & 2016?
5.3.6 Do you know any family member or anyone who lost a child after childbirth between 2006 and 2016?
5.3.7 Did you / a family member / anyone you know ever lose a partner during childbirth between 2006 and 2016?
5.3.8 Did you / a family member / anyone you know ever lose a partner after childbirth between 2006 and 2016?

	Question on child lost between 2006 and 2016	Yes	% YES	NO	% NO	Total
5.3.3	Do you or your partner lost (during)	38	24%	123	76%	161
5.3.4	Do you know a family member who lost(during)	76	47%	85	53%	161
5.3.5	Do you ever lose (after)	43	27%	118	73%	161
5.3.6	Do you know a family member who lost(after)	49	30%	112	70%	161
5.3.7	Do you know anyone who lost (during)	60	37%	101	63%	161
5.3.8	Do you know anyone who lost (after)	62	39%	99	61%	161
	Total	328		638		



In all the questions over 50% of the respondents did not know of any child loss between 2006 and 2016. However, the respondent who know of losses (death) whereas the number (If yes, how many) they know of, and their responses are summarised in the table below

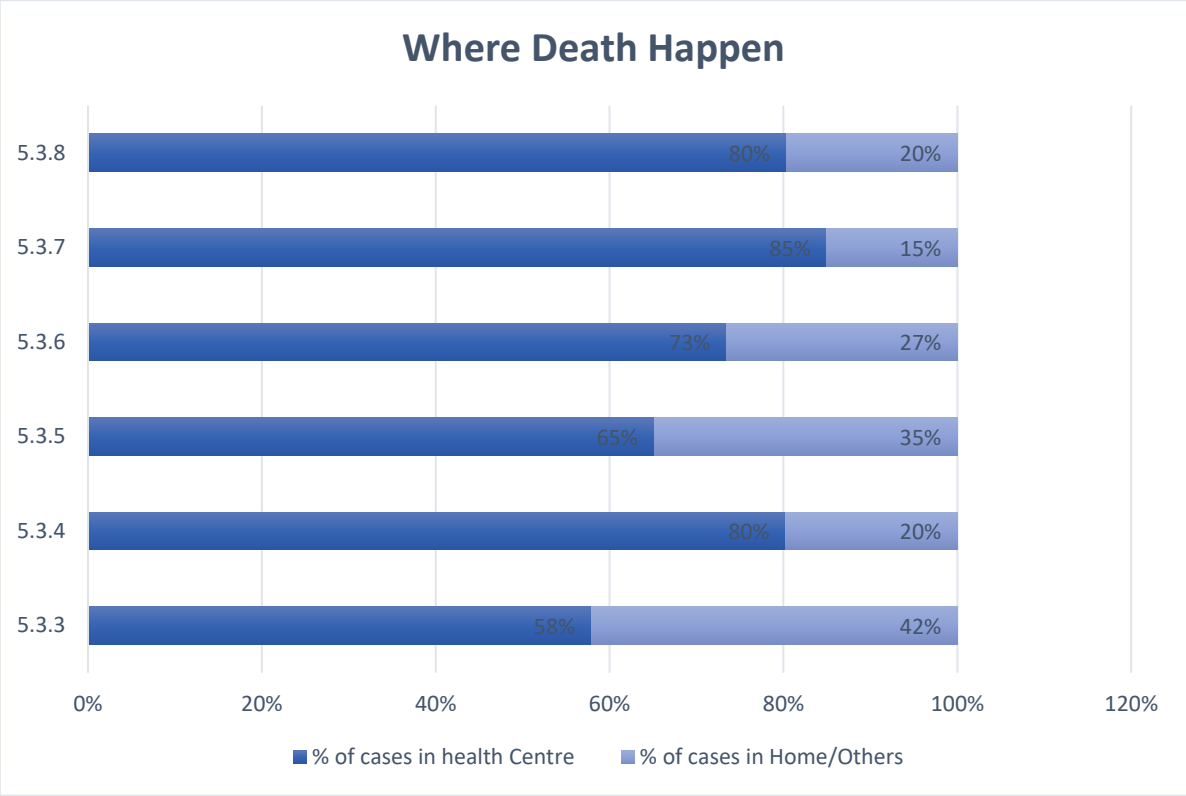
If Yes, How Many?						
No. of lost Respondents know of	5.3.3	5.3.4	5.3.5	5.3.6	5.3.7	5.3.8
1	25	50	36	34	49	49
2	12	19	4	12	5	11
3	0	4	1	2	5	1
4	1	1	0	0	1	1
5	0	1	2	1	0	0
6	0	0	0	0	0	0
7	0	1	0	0	0	0
Total	38	76	43	49	60	62

For example, of the 38 respondents (question 5.3.3) who said they or their partner lose a child during childbirth between 2006 and 2016, 25 said they lost one (1) child each, 12 said 2 children each, none lost 3, and 1 lost 4 children.

The respondents (who said they know of death cases) where are further when the loss (death) happen; whether in a health facility (Clinic, Hospital or health centre) Or elsewhere (Home, others-farm, road etc.).

As shown in the table below majority of the respondents who said they know of death cases said they happen in health facilities. For example, 85% of respondents when asked (question5.3.3.7) if they or a family member or anyone had lost a partner during childbirth between 2006 and 2016, answered in the affirmative

Where it Happens					
Question#	# of cases in health Centre	% of cases in health Centre	# of cases in Home/Others	% of cases in Home/Others	Total
5.3.3	22	58%	16	42%	38
5.3.4	62	83%	15	20%	76
5.3.5	28	65%	15	35%	43
5.3.6	36	73%	13	27%	49
5.3.7	51	85%	10	17%	60
5.3.8	49	80%	12	20%	61
Total	248		81		



The enumerators/data collectors then asked the respondent who said the loss (death) happened in a health facility if it had anything to do with NAWEC power outage. Their responses are captured in the table below. 19 said the death is as a result of NAWEC power outage, 133 said it is not as a result of NAWEC power outage. . 96 said they DID NOT KNOW if it is as a result of NAWEC power outage.

If Death Has To Do With NAWEC Power Outrage							
	# yes	% yes	# No	% No	# Did not know	% Did not know	Total
5.3.3	1	5%	16	73%	5	23%	22
5.3.4	7	11%	26	43%	29	48%	62
5.3.5	4	14%	18	64%	6	21%	28
5.3.6	3	8%	22	61%	11	31%	36
5.3.7	2	4%	21	41%	29	57%	52
5.3.8	2	4%	30	61%	16	33%	48
Total	19		133		96		248

However; The total number of deaths reported by the 19 respondents who said death was as a result of NAWEC power outage in health facilities is 43. For example, when asked question 5.3.4 (Do you know any family member or anyone who lost a child during childbirth between 2006 and

2016?),7 out of the 19 respondents know of 15 deaths in total. One (1) among the 7 know of a death case when asked question 5.3.6 and another One (1) among the 7 know of a death case when asked question 5.3.7.

Total No. Of Death Known Per Each Question By Respondents							Total
# of Respondent	5.3.3	5.3.4	5.3.5	5.3.6	5.3.7	5.3.8	
1	2	0	1	0	0	0	3
7	0	15	0	1	1	0	17
4	2	0	12	0	0	0	14
3	0	1	0	3	0	0	4
2	0	1	0	0	2	0	3
2	0	0	0	0	0	2	2
19	4	17	13	4	3	2	43

5.3.9 Do you know a family member or someone who died during surgery as a result of NAWEC power outage between 2006 & 2016?

The above was the final question the enumerators/data collectors asked the respondents. 1 respondents said s/he did not know,139 said No, and 21 said they knew of at least one person who died during surgery as a result of NAWEC power outage between 2006 & 2016

Knowledge Of Death During Surgery	# Of Death During Surgery	% Of Death During Surgery
Did not know	1	1%
No	139	86%
Yes	21	13%
Grand Total	**161**	100%

If Yes how many?

Out of the 21 respondents who said they know of a family member or someone who died during surgery as a result of NAWEC power outage between 2006 & 2016; 17 said they know of one (1) person each and four (4) said they know of two (2) people each.

Conclusions

This data survey report reveals that power outages significantly contributed to maternal mortality in The Gambia between 2006 and 2016. Beyond the statistical spikes in maternal deaths coinciding with blackouts, the report paints a stark picture of how unreliable electricity thwarts essential healthcare services and threatens the lives of pregnant women, newborns and

people who undergo surgery. Due to limited information and the small sample size used in this survey, the findings of the report cannot be used to represent the national statistics of maternal mortality as related to electricity outage.

Key Findings:

- **Direct impacts:** Power outages disrupted critical medical equipment like fatal monitors, oxygen concentrators, and delivery lamps, jeopardized interventions during childbirth, and endangered both mother and child.
- **Indirect effects:** Lack of refrigeration compromised vaccine and blood bank storage, hindering essential preventive measures and emergency treatments. Additionally, communication breakdowns caused by blackouts hampered timely referrals and access to specialized care.
- **Disproportionate burden:** Rural areas, which were already facing healthcare disparities, are disproportionately affected by power outages due to inadequate infrastructure. This exacerbates existing inequities and leaves vulnerable women most at risk.

Recommendations:

- **Urgent investment in reliable power:** Prioritize infrastructure upgrades and renewable energy solutions to ensure stable electricity supply in healthcare facilities, particularly in rural areas.
- **Backup systems and training:** Equip hospitals and clinics with robust backup generators and train staff on their efficient operation during blackouts.
- **Data collection and analysis:** Strengthen data collection mechanisms to accurately map outage-related maternal deaths and inform targeted interventions.
- **Advocacy and public awareness:** Raise awareness about the impact of power outages on maternal health and advocate for policy changes that prioritize reliable electricity access in healthcare settings.

Looking Forward:

The Gambian government, healthcare professionals, and the international community must collaborate to break the perilous link between power outages and maternal mortality. By urgently addressing the lack of reliable electricity and strengthening healthcare infrastructure, the government can prevent needless deaths and pave the way for a future where every mother in The Gambia has the chance to deliver a child safely, regardless of the darkness outside.

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