



مركز العالم العربي للبحوث والتنمية
Arab World for Research & Development

Japan Platform (JPF)

The Impact of the Electricity Chronic Crisis on the Lives of Children in the Gaza Strip (Focus on child health and education)

August 2022

Arab World for Research and Development (AWRAD)

Al-Masayef., Kamal Nasser St., Building # 43. P.O. Box: 2238, Ramallah – Palestine

Al – Saraya, Tomouh Building, Sixth floor – Gaza City - Palestine

In their own words

“My 10-year-old child with disability was lucky to obtain an electric wheelchair; he is stranded at home, unable to go to rehabilitation, when the chair is not charged.” (Mother of 10-year-old, 39, Rafah)

“It is way too hot in the summer; not having a proper refrigerator and electricity cuts force me to use canned products, which I know is not good for the health of my children.” (Mother of 5 children, 45, Nusairat)

“My children hate to study when it is dark, too hot or too cold; it is becoming an ordeal and we are struggling to convince them to focus; on the one hand, they don’t like to study anymore, they don’t want to go to school. During the Pandemic, they couldn’t access much of the virtual classes and search for information through the Internet.” (Father of 3 children, Beit Hanun)

“During the winter, I don’t sleep very well; when the electricity is off, I must watch that my children don’t play with the candles which are our source of light; so many children have been burned to death as a result.” (Father of 4 children, 44, Shujai’a)

Contents

Contents	2
Acronyms.....	3
List of Tables.....	4
List of Figures.....	4
Introduction and Context	5
Introduction.....	5
Country Context and Sector Overview	6
Research Methodology	10
Key Findings.....	12
Characteristics of the Sample (total sample = 200)	12
The Power Crisis in The Gaza Strip	15
Recommendations.....	28
Bibliography.....	31
Annex I: Quantitative Questionnaire.....	32
Annex II: Key Informant Interview Guidelines.....	43

Acronyms

AWRAD	Arab World for Research and Development (AWRAD)
CBOs	Community Based Organizations
FGDs	Focus group discussions
KIIs	Key informant interviews
MOE	Ministry of Education
MOH	Ministry of Health
NGOs	Non-governmental organizations
PCBS	Palestinian Central Bureau of Statistics
PNRA	Palestinian Energy and Natural Resources Authority
PTSD	Post-Traumatic Stress Disorder
PwDs	People with Disabilities

List of Tables

Table 1: Survey sample distribution	11
Table 2: In-depth interviews list	12
Table 3: KIIs list	12
Table 4: Education of children in targeted households.....	14
Table 5: Statistically significant differences between those with relatively more and relatively less access to electricity in the Gaza Strip.....	27

List of Figures

Figure 1: Gender of the respondents.....	14
Figure 2: Age of the respondents	13
Figure 3: Occupation of respondents.....	14
Figure 4: marital status of the respondents	13
Figure 5: Refugee status	14
Figure 6: Educational attainment (highest level attained)	14
Figure 7: Gender of the head of household	15
Figure 8: Electricity access per day.....	16
Figure 9: Power deficit in Gaza: OCHA, 2021	17
Figure 10: Access to alternate energy sources.....	18
Figure 11: Percentage of families reporting that the physical health of following members was negatively impacted.....	19
Figure 12: Number of meals served to the children per day	21
Figure 13: Eating canned food as a substitute to fresh food	22
Figure 14: Percentage of caregivers reporting mental/emotional negative impacts on children as a result of electricity outages	23
Figure 15: Electricity cut off at school	25

Introduction and Context

Introduction

Japan Platform (JPF) is an international aid organization that was created in Tokyo in 2000. JPF supports emergency projects in 47 countries and is committed to provide humanitarian assistance to those in need. JPF has been working in the Gaza Strip since 2014 in a range of assistance areas including food, shelter, health as well as rehabilitation and vocational training for the physically impaired. Starting from 2018, JPF has been undertaking multi-year health care and nutrition projects.

JPF is keen on strengthening its own capabilities, and those of its partners, to design and implement effective and targeted health-focused interventions in the Gaza Strip - Palestine. As such, JPF contracted the Arab World for Research and Development (AWRAD) to conduct the present assessment, focusing on children's health and education. This was with the intention to strengthen the capacity of member NGOs to meet needs and priorities of the most vulnerable and design quality, well-targeted interventions in the Gaza Strip for coming years.

The member non-governmental organizations (NGOs) pointed this area of study as a knowledge gap. The assessment team carefully reviewed existing research and found that the impact of the chronic electricity crisis on children (under 18 years old) in the Gaza Strip is an area that is lagging in the existing research. Hence, it is insufficiently addressed in the programming of humanitarian actors in the Gaza Strip. While the existing evidence-based research is limited, much of the anecdotal evidence and a few studies reveal that children in the Gaza Strip bear the brunt of the crisis. Electricity shortages, as well as the substandard quality of electricity supply, disproportionately impact children. A number of reports confirm that they are living in dire and deteriorating conditions due to ongoing power shortages. According to Save the Children²:

- ✓ More than 700 schools struggling to function without electricity.
- ✓ Breakdown of health and emergency services putting children's lives at risk.
- ✓ Water-borne diseases increasing because of power shortages.
- ✓ Environmental disaster due to untreated sewage.
- ✓ Children unable to sleep, study or play.

Three brothers, aged between two and five years old, were the latest victims of Gaza's electricity crisis perpetuated by Israel's 13-year closure of the Gaza Strip (November 2020)¹ and the substandard related services and infrastructure.

Such a situation has grave implications on the health and education of these children. The current assessment provides a deep-dive analysis of the impact of electricity shortages, inconsistency, quality, and the use of alternative sources (candles, generators) on the various dimensions of child health and education. On the one hand, the assessment investigates the impact on child health as it relates to mother health, pre-natal health, post-natal health, lactating women, nutrition, weight, infectious diseases, access to health services and vaccination, etc. On the other hand, it provides analysis on the impact on education, such as educational

¹ DCI, 2020. Gaza's Electricity Crisis Claims Another Three Palestinian Children.

https://www.dci-palestine.org/gazas_electricity_crisis_claims_another_three_palestinian_children

² Save the Children, 2017. Gaza: 1 Million Children Suffering in 'Unlivable' Conditions.

<https://www.savethechildren.org.uk/news/media-centre/press-releases/gaza-1-million-children-suffering-unlivable-conditions>

attainment, opportunities, early childhood development, access to nurseries, kindergartens and schools, and dropout rates.

Country Context and Sector Overview

Overall Context

According to the Palestinian Central Bureau of Statistics (PCBS), the estimated population of Palestine was approximately 5.23 million in 2021, with roughly 3.12 million in the West Bank and 2.11 million in the Gaza Strip. The population of Palestine is relatively young. PCBS sources (mid-2022) estimate that 1,023,7771 Palestinian children live in the Gaza Strip, comprising 47.3 percent of the population³. Children under 15 comprise 38 percent of the Palestinian population in the West Bank and Gaza Strip; 36 percent in the West Bank and 41 percent in the Gaza Strip.⁴

One of the major challenges facing the Palestinian population, specifically in the Gaza Strip, is the insufficient amount of power supply, the lack of control over power sources and the limited ability to maintain and sustain electricity-related infrastructure. This is mainly due to the policies and practices of the Israeli occupation. This, in addition to a level of inefficiency in management of the generation and distribution of electricity in the Strip. In the West Bank, the total electricity supply is 850 MW; around 65 MW is generated from renewable energy sources, 35 MW is supplied by Jordan, and the remaining 750 is provided through the Israeli occupation. In the West Bank there are five operating electricity companies, while in the Gaza Strip the Gaza Power Generation Company (GPGC) operates a power station called the Gaza Power Plant (GPP). The plant currently operates at partial capacity due to the reliance on less efficient diesel fuel and limited funds for the purchase of fuel, with no formal or systemic use of renewable energy. The following section provides a general overview of the electricity situation in the Gaza Strip and how it is impacting other sectors and the lives of citizens in the Gaza Strip⁷.

Electricity Sector in the Gaza Strip

The Gaza Strip has limited access to electricity, with only two electricity supply sources, the first source is the Israeli electricity companies; supplying 120 MW to the Gaza Strip through ten electricity lines, and the second source is the Gaza Strip Power Plant (GPP). The main electricity supply source (GPP) has been bombed and destroyed by the Israeli occupation in 2006. The plant has stopped working completely and the electricity shortage exacerbated afterwards. The amount of damage caused by the bombardment was about six million dollars, and the GPP was closed until 2009⁸. However,

According to PCBS (mid-2022), 1,023,7771 Palestinian children live in the Gaza Strip, comprising 47.3 percent of the population⁵. Children under 15 comprise 38 percent of the population; 36 percent in the West Bank and 41 percent in the Gaza Strip.⁶

³ PCBS, 2022. Press Release, 4 May 2022. <https://pcbs.gov.ps/post.aspx?lang=en&ItemID=4213>

⁴ PCBS, 2021. <https://www.pcbs.gov.ps/site/512/default.aspx?lang=en&ItemID=4024>

⁵ PCBS, 2022. Press Release, 4 May 2022. <https://pcbs.gov.ps/post.aspx?lang=en&ItemID=4213>

⁶ PCBS, 2021. <https://www.pcbs.gov.ps/site/512/default.aspx?lang=en&ItemID=4024>

⁷ International Trade Administration. 29021. "West Bank and Gaza- Country Commercial Guide". 26 October 2021. <https://www.trade.gov/country-commercial-guides/west-bank-and-gaza-energy>

⁸ Aljazeera, 2017. "The Electricity Crisis in Gaza ... Another Dark Side of the Siege". 13 June 2017. <https://bit.ly/3HfhWiU>

this was not the only time the Israeli occupation targeted electricity sources in the Gaza Strip, the electricity supply sources were bombed several times in 2008, 2012, 2014 and in 2021. Throughout the wars on the Gaza Strip, the Israeli occupation has deliberately targeted water and electricity networks leading to extensive destruction in the infrastructure, and hindering the access to basic services including water and energy.

As of 2022, OCHA estimates that the Gaza Strip requires 504 MW of electricity per day, while the available supply averages at 202 MW per day; 119 of those 202 are supplied by Israeli lines, and the remainder is produced by the Gaza Power Plant. This means that there is a deficit 302 MW per day, resulting in Gaza having -on average- 12 hours of power per day, a decrease of one hour since 2020 and 2021.⁹

The average monthly consumption of power in the Gaza strip is 265 kWh per household¹⁰, and with the average household in Gaza consisting of 5.7 persons¹¹, this means that the average person consumes 46.5 kWh per month, or 558 kWh per year. ESMAP estimates that for modern society needs, such as the operation of home appliances, cooling and heating, a person requires approximately 2000 kWh per year¹². For the most basic of subsistence level electricity, a person requires roughly 100 kWh per year. So, while the average possesses for people in Gaza are enough electricity to survive, they are only at 25 percent of the electricity supply of modern societal needs. Consequently, people in Gaza Strip find themselves needing to prioritize their electricity usage to be able to partake in more aspects of modern society, or operate devices necessary for income generation.

The shortage of electricity supply has adversely impacted the lives of Palestinians in the Gaza Strip, affecting the health and education systems, water, agriculture and economic growth. The situation has further deteriorated due to the political division between Fatah and Hamas (two authorities, Fatah in the West Bank and Hamas in the Gaza Strip), which has been ongoing since 2007. The failure of finding a long-lasting agreement between the two Palestinian authorities on issues related to tax exemption for fuel and revenue collection from electricity consumers resulted in the escalation of the Gaza Strip's electricity crisis. Furthermore, the ongoing electricity crisis was aggravated when the Israeli occupation bombed the GPP again during its relentless bombardment on 29 July 2014. Not only was the GPP forced to shut down but also all ten feeder lines from Israel to the Gaza Strip were damaged, as well as large sections of the internal distribution lines¹³ were severely damaged. The Israeli occupation continued its collective punishment of two million Palestinians living in the Gaza Strip during its last bombardment which happened on May 2021; bombing random electricity and water networks causing great losses to the infrastructure.

Due to the continued violence against the Gaza Strip and the destruction of the infrastructure, it became nearly impossible for the Palestinian authorities to provide electricity covering the basic needs of its citizens. This has contributed to the already deteriorating humanitarian situation and socioeconomic conditions in the Gaza Strip.

⁹ OCHA, *Electricity in the Gaza Strip*. 2022. <https://www.ochaopt.org/page/gaza-strip-electricity-supply>

¹⁰ Monna, Sameh, et al. "A Comparative Assessment for the Potential Energy Production from PV Installation on Residential Buildings." *Sustainability* 12.24 (2020): 10344.

¹¹ PCBS-UNFPA Joint Press Release on the occasion of World Population Day, July 11th, 2021. <https://palestine.unfpa.org/en/news/pcbs-unfpa-joint-press-release-occasion-world-population-day>

¹² ESMAP, *Household Energy Access for Cooking and Heating: Lessons Learned and the Way Forward*. 2011.

¹³ OCHA. 2014. "Electricity and water infrastructure severely damaged during hostilities." The monthly Bulletin | August 2014. <https://www.ochaopt.org/content/electricity-and-water-infrastructure-severely-damaged-during-hostilities>

As such, the impact of the electricity shortage extends to all segments of society, especially children and people with disabilities. The education and health sectors are some of the major sectors affected by the electricity shortage, alongside to the impact of COVID-19 pandemic that played a role in worsening the living situation in the Gaza Strip.

Electricity and Education

In the Gaza Strip, access to quality education in a safe, child-friendly environment is compromised by the protracted conflict and occupation¹⁴. The education system is severely affected due to the continued closure and wars, confiscation of equipment, double/triple shift system, destruction of school infrastructure, economic burdens, the inability to prioritize education, lack of funding, and electricity shortages. All of these factors combine to limit children's access to quality education. During the latest escalation in 2021, 149 public and private schools and 37 UNRWA schools were damaged.

Schools operating in the Gaza Strip suffer from electricity shortages. In Gaza, Students are forced at times to attend classes without power. Many of the classes are dependent on the availability of electricity such as science lab classes and others. In addition to the electricity shortage, some private/public schools have been fully demolished during the Israeli aggression on the Gaza Strip, others have been partially demolished. Some UNRWA schools have been partially damaged as well, and other schools have been used as emergency shelters. As a result, the education system became fragmented and unable to provide sustained services to children. Due to the challenges faced, a new education operating system was created: the double/triple shift school system. Within this system, some schools start at 8am until 12pm while other schools start at 1pm until 4pm. The system reduces the learning hours, and the ability for teachers to support children, especially those who have learning and behavioral difficulties¹⁵. Furthermore, going to school with shattered windows, cracked walls, damaged playgrounds, and dark classrooms affects children negatively. It reduces their ability to focus during class, and increases their tendency towards violence. Additionally, having to share a desk with multiple students¹⁶ as a result of crowded schools increases children's frustration.

In Gaza, Students are forced at times to attend classes without having electricity. Many of the classes are dependent on the availability of electricity such as science lab classes and others.

The COVID-19 pandemic has only exacerbated the difficulties facing the educational system. Full school closures were enacted at times during the past two years, and schools had to alternate between online and offline classes. Distance learning approaches were nearly impossible to apply in the Gaza Strip as a result of electricity shortages, whereby in some areas electricity is only available for four hours per day, and only 35 percent of Palestinian households have access to home computers¹⁷.

¹⁴ UNDP. 2017. "Right to Education in the Gaza strip". May 1 2017. <https://www.ps.undp.org/content/papp/en/home/presscenter/articles/2017/05/01/right-to-education-in-the-gaza-strip-.html>

¹⁵ UNICEF. 2018. "Nearly 25 per cent of boys aged between 15 out of school in the State of Palestine". 26 July 2018. <https://www.unicef.org/press-releases/nearly-25-cent-boys-aged-15-out-school-state-palestine>

¹⁶ UNICEF. 2016. "Children in Gaza design their dream school". 14 December 2016. <https://www.unicef.org/stories/children-gaza-design-their-dream-school>

¹⁷ OCHA. 2021. "Statement by United Nations Humanitarian and Resident Coordinator in the occupied Palestinian Territories, Lynn Hastings". 15 August 2021. <https://www.ochaopt.org/content/it-s-back-school-12-million-children-palestine-they-deserve-security-safety-and-hope-statement-united-nations>

Electricity and Health

The availability of electricity is directly correlated with positive health outcomes and indicators¹⁹. The quality and access to care, mortality rate, disease cases, hygiene and food quality are all impacted by the availability of electricity. Many countries and areas do not have access or have limited access to electricity, such communities find alternatives such as candles, chargeable lights, inside and outside converters and solar panels. In the Gaza Strip, most families with low income who are unable to access safe alternatives use candles, inverters, and chargeable lights. However, the consistency in using candles increases indoor pollution, leading to health problems among family members, mostly women and children, who develop health conditions like coughing and child asthma²⁰. Using candles and primitive emergency lights also increases the chances of fires and burning injuries. Multiple fire incidents occurred in the Gaza Strip in the past few years, whereby some of these cases caused death. A study by AWRAD (2020) reveals that the burn rate in Gaza is higher (1.64 percent) than the West Bank (1.2 percent). It shows that children comprise the largest group among the burned with 39.3 percent of them being under 18 years old (24 percent of them are 8 years or younger). 28.6 percent are in the age group of 30-50, while 19.9 percent are youth (18-30 years old). The rest (12.2 percent) are older than 50 years old.

Between 2010 and 2020, Al Mezan Center for Human Rights (2020) documented the death of 35 people including 28 children as a result of fires resulting from alternatives to electricity. Other serious injuries documented as a result of fire included 36 injuries of which 20 children were injured¹⁸, meanwhile hospitals lack sufficient electricity and equipment to treat burn cases.

The healthcare system is deeply affected by electricity shortages. Having a cooling system to store medication and vaccinations to maintain a certain level of protection against diseases is critical especially for children. Children must take certain vaccinations while they are infants or under the age of two so they can avoid deadly diseases like Pneumonia. The lack of electricity does not only affect children, it also impacts mothers. Not having accessibility to electricity jeopardizes child delivery at times, as it puts the life of the mother and the baby in danger due to the inability to use electric dependent essential equipment.

As a result of electricity shortage and lack of adequate food storage mechanisms, families in the Gaza Strip are subject to poor nutrition. Canned food consumption increases due to inactive food storing systems²¹, also drinking water is impacted by electricity shortage as there are no adequate water sterilizing mechanisms.

The electricity shortage does not only impact the physical health of children and adults in the Gaza Strip, but affects their mental health as well. Psychological and mental disorders are increasing in the Gaza Strip. Being confined in “the world’s largest open-air prison” and the continued aggressions has contributed to this increase. Most people living in the Gaza Strip suffer from posttraumatic stress disorder (PTSD).²² Mental health

¹⁸ Al Mezan Center for Human Rights, 2020. <https://bit.ly/3pf7YYF>

¹⁹ Irwin, Bridget R., Klesta Hoxha, and Karen A. Grépin. "Conceptualising the effect of access to electricity on health in low-and middle-income countries: a systematic review." *Global Public Health* 15.3 (2020): 452-473.

²⁰ AFRICAN ACADEMIC RESEARCH FORUM. 2014. "Rethinking Teaching and Learning in the 21st Century". September 2014. <https://aa-rf.org/wp-content/uploads/2019/04/saice-2014-proceedings.pdf#page=11>

²¹ The American Dietetic Association. 2007. "Water and Food Safety in the Developing World: Global Implications for Health and Nutrition of Infants and Young Children". November 2007. <https://sci-hub.hkvisa.net/10.1016/j.jada.2007.08.013>

²² OXFORD and The American Public Health Association. 2008. "War and Public Health". <https://bit.ly/358vXBL>

problems affect children in all aspects, and it reduces their ability to interact with their parents and peers²³. The Ministry of Health in the Gaza Strip stated that 1,800 persons undergo intensive mental health treatment each year and more than one third of the population require mental health support²⁴.

With COVID-19 and the current political economic situation, the number of people in need of mental health support is increasing. With the electricity shortage, treating mental health problems is more difficult, clinics are closed for long times, and going to treatment without having electricity can worsen the situation.

Electricity shortage has made the lives of citizens in the Gaza Strip unbearable; it also affected the water supply. With the electricity only coming for six hours per day, availability of network water has become inconsistent and influenced by the hours of electricity availability²⁵. Not having water for days has made it harder to complete daily household tasks, and maintain personal hygiene impacting the health of citizens.

Electricity shortage did not only impact people, but it also harmed the environment. The Gaza Strip is facing challenges in sewage water treatment in the absence of electricity needed to activate the sewage treatment plant; sewage water is being pumped towards the shore of the Gaza Sea. In addition, the frequent closures of the Karam Abu Salem commercial crossing point by the Israeli occupation²⁶, which was the only mean for fuel transfer into Gaza Strip, has exacerbated the electricity shortage crises.

Electricity and Economy

The political instability and its repercussions for the past 15 years has had its toll on the economic situation in the Gaza Strip. Vendors, farmers and fishermen were directly affected by the economic crisis and the power shortage. Farmers require electricity to pump water into their lands to irrigate crops. When electricity is available for only four to eight hours per day mostly during the night, farmers are not able to complete their work efficiently. Whereby some vendors including small/big business owners had to shut down their businesses at certain points due to electricity shortage, in addition to bearing extra costs which made them fall into debt. Some factory owners were forced to lay off workers, which increased the rate of unemployment. By the end of 2020, unemployment rates were 46.6 percent, the number of closed factories were up to 577²⁷ and the number of workers in the industrial sector went down from 16830 to 13770²⁸.

Research Methodology

The research team undertook a desk review of relevant studies and materials, in addition to informal interviews with relevant stakeholders in an effort to gain greater context of the electricity situation in the Gaza Strip. This allowed the team to customize the research tools, improving the targeting and relevance of

²³ International Journal of Behavioral Development. 2008. "Child Development and Family Mental Health in War and Military Violence: The Palestinian Experience". <https://sci-hub.hkvisa.net/>

²⁴ Palestine Now, 2021. <https://bit.ly/3BUs13B>

²⁵ Al-Iqtisadi, 2021. <https://bit.ly/3JHRjVo>

²⁶ Al-Hadath, 2021. <https://bit.ly/3vdQ4Jn>; for more on the frequency of closure of crossings to Gaza, refer to: OCHA, <https://www.ochaopt.org/content/movement-and-out-gaza-update-covering-january-2022>

²⁷ Quds Net News, 2021. <https://bit.ly/3haAoyD>

²⁸ Al Mezan Center, 2021. "The reality of the Economic, Social and Cultural Rights" <https://mezan.org/uploads/files/161607903255.pdf>

questions and indicators. In order to achieve the above objectives, we collected data and information using the following methods:

- Quantitative survey questionnaire
- In depth interviews with household members
- Key Informant Interviews (KIIs)

We have developed a survey questionnaire, in-depth interviews and KII Guidelines. The questions and guidelines for each of these data collection tools were designed under a unified thematic framework, which included themes, indicators and sub-indicators. Each was individually operationalized for the respective tools.

The Survey Questionnaire

The survey was carried out in December of 2021, and included 200 participants from households distributed across all districts in the Gaza Strip. Our sample size was calculated using a confidence interval of 95 percent which yields a ± 5 percent margin of error in any population size. The following table presents the districts and communities targeted:

Table 1: Survey sample distribution

District	Community
Gaza – North	Beit Hanun
	Jabalya
Gaza District	Gaza city
	Shujaya
Gaza – Middle	Dier Al-Balah
	Al Nuseirat
Khan Yunis District	Khan Yunis
	A'basan al Kabira
Rafah District	Rafah

The AWRAD team selected a sample of households based on the latest and most up to date (June, 2019 or January 2020) locality maps. Our sample was a **systematic representative sample** of the households.

A team of researchers was deployed in each targeted area. The team was comprised of data collection experts with years of experience in field research and within projects in similar fields. To maintain the quality of data, the supervisors checked the performance of all of the data collectors thoroughly throughout the assignment. The supervisors also kept an Interviewer Progress Sheet on each data collector. Data was entered and uploaded by our experienced data entry teams in an SPSS data file. Our core team then reviewed the data collected and ran data verification tests to ensure that all data has been collected accurately and according to plans.

In-depth Interviews

AWRAD undertook eight in-depth interviews (5 males, 3 females) with members of households in Gaza to fully understand, contextualize and further explain the initial findings. The in-depth interviews were carried out in March of 2022, and targeted four females and four males according to the following:

Table 2: In-depth interviews list

Type	Number
Employee – public sector	2 (1 Female, 1 Male)
Employee – private sector	2 (Male)
Housewife	1 (Female)
Unemployed	2 (Male)
Chronic disease patient	1 (Female)

Key Informant Interviews (KIIs)

Moreover, AWRAD conducted five (5) interviews with the following relevant stakeholders:

Table 3: KIIs list

#	Organization	Name - Position
1	UNICEF	Mohammad Abu Sulieman – Social Behavior Change Officer
2	Gaza Municipality	Anwar Al Jundi - Coordinator of the General Department of Water and Sanitation
3	Ministry of Health	Bassam Al Hamadien – General Director of Engineering and Maintenance at the Ministry of Health
4	Ministry of Education	Haifa' Hsouneh – Private Schools and Kindergartens Supervisor in West Gaza
5	Civil Defense	Major Mohammad Jaloumbo

Data Analysis and Reporting

Data collected through the survey were analyzed using SPSS. Analysis included identifying relationships between variables to capture the salience of variables. Moreover, we used frequency analysis to present the quantitative findings as well as a weighted average analysis for some results.

We synthesised the findings from the various data collection tools to determine key findings and conclusions to inform the future planning of JFP's future interventions.

Key Findings

Characteristics of the Sample (total sample = 200)

Gender and age of respondents

The figures below show that the 50 percent of the respondents (caregivers) were males and 50 percent were females. The vast majority of respondents were within the age groups of 26-41 (42.5 percent) and 42-64 (39 percent).

Figure 1: Gender of the respondents

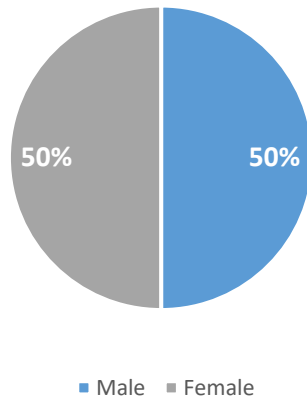
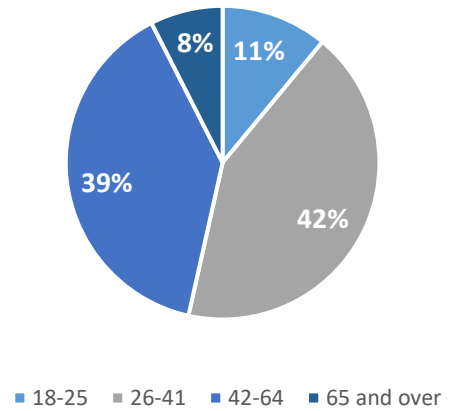


Figure 2: Age of the respondents



As for the marital status of the respondent caregivers from the households, the vast majority of them (83 percent) are married, while 10 percent are single. The remaining 7 percent are either divorced or widowed.

Figure 3: Occupation of respondents

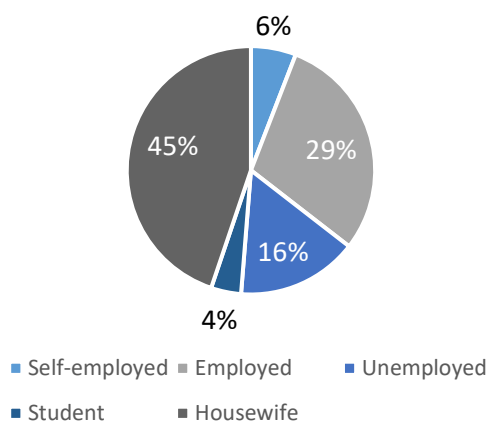


Figure 4: marital status of the respondents

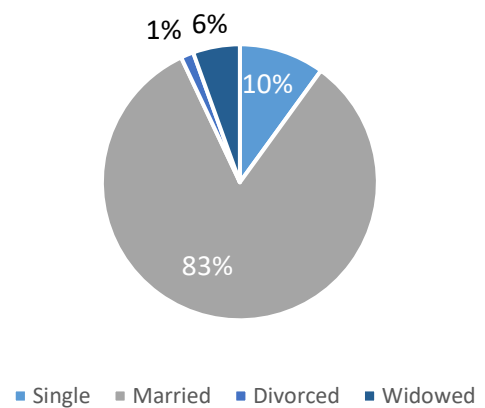
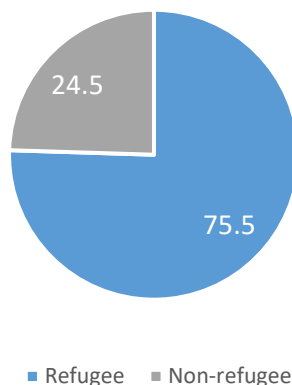


Figure 5: Refugee status

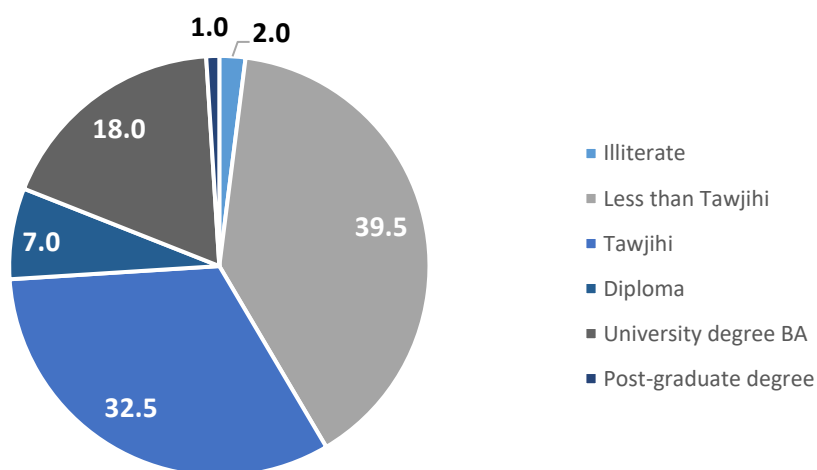


Moreover, 75.5 percent of the respondents were refugees, and the average family size is 6.10 members. The following table provides the distribution of children by education:

Table 4: Education of children in targeted households

Children’s education	Sum - total
Number of children in elementary and secondary school	340
Number of students in university/college	77
Number of children who dropped out of school (before 10th grade): Males	44
Number of children who dropped out of school (before 10th grade): Females	4

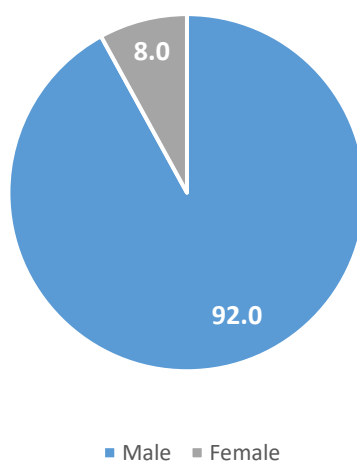
Figure 6: Educational attainment (highest level attained)



Based on the quantitative survey, the majority of caregivers (39.5 percent) reported that they completed less than 12 years of education (high school diploma - Tawjihi)²⁹, and 32.5 percent completed 12 years of education.

In addition, 92.5 percent reported that the head of the household is male, with 88 percent of them are fathers. Only 8 percent report that a female is the head of household. This comparable to Gaza-wide data on heads of households³⁰.

Figure 7: Gender of the head of household



As much as 14 percent of the interviewed households (n: 28) have at least one person with disability (PwD), for a total of 32 family members. The largest group of reported PwD are male children (59 percent), followed by female children (25 percent)³¹, and adult parents – male and female comprise 16 percent of the PwDs.

The Power Crisis in The Gaza Strip

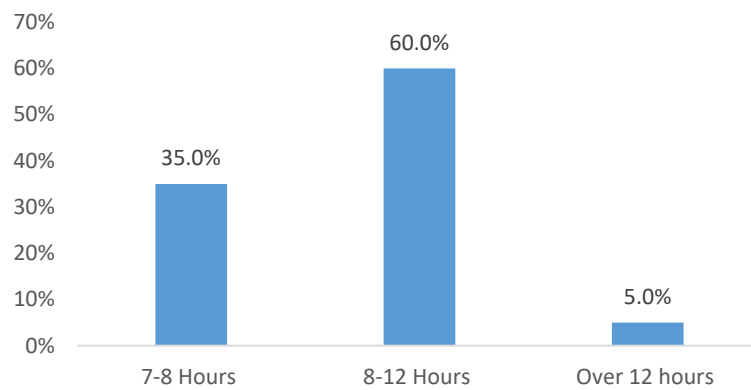
In general, very few Gaza Palestinians (5 percent) have access to electricity beyond 12 hours per day. The majority (60 percent) report having access between 8 and 12 hours a day, while approximately a third (34 percent) have electric power between 7-8 hours per day. Northern Gaza and Khan Younis had the highest percentage of households reporting 7-8 hours of power per day, with relatively few in those areas having above that, at (77 percent) and (65 percent) respectively. Rafah and Middle Area of Gaza had the highest access to electricity, where (92 percent) and (90 percent) report having 8-12 hours of electricity per day, respectively.

²⁹ Tawjihi is the General Secondary Education Certificate Examination in Palestine and is the last stage of school education.

³⁰ See PCBS data, https://www.pcbs.gov.ps/statisticsIndicatorsTables.aspx?lang=en&table_id=901

³¹ The trends are consistent with CBS data, where males have a higher probability of being with a disability than females. This might be partially due to limited reporting on female disability due to social norms.

Figure 8: Electricity access per day

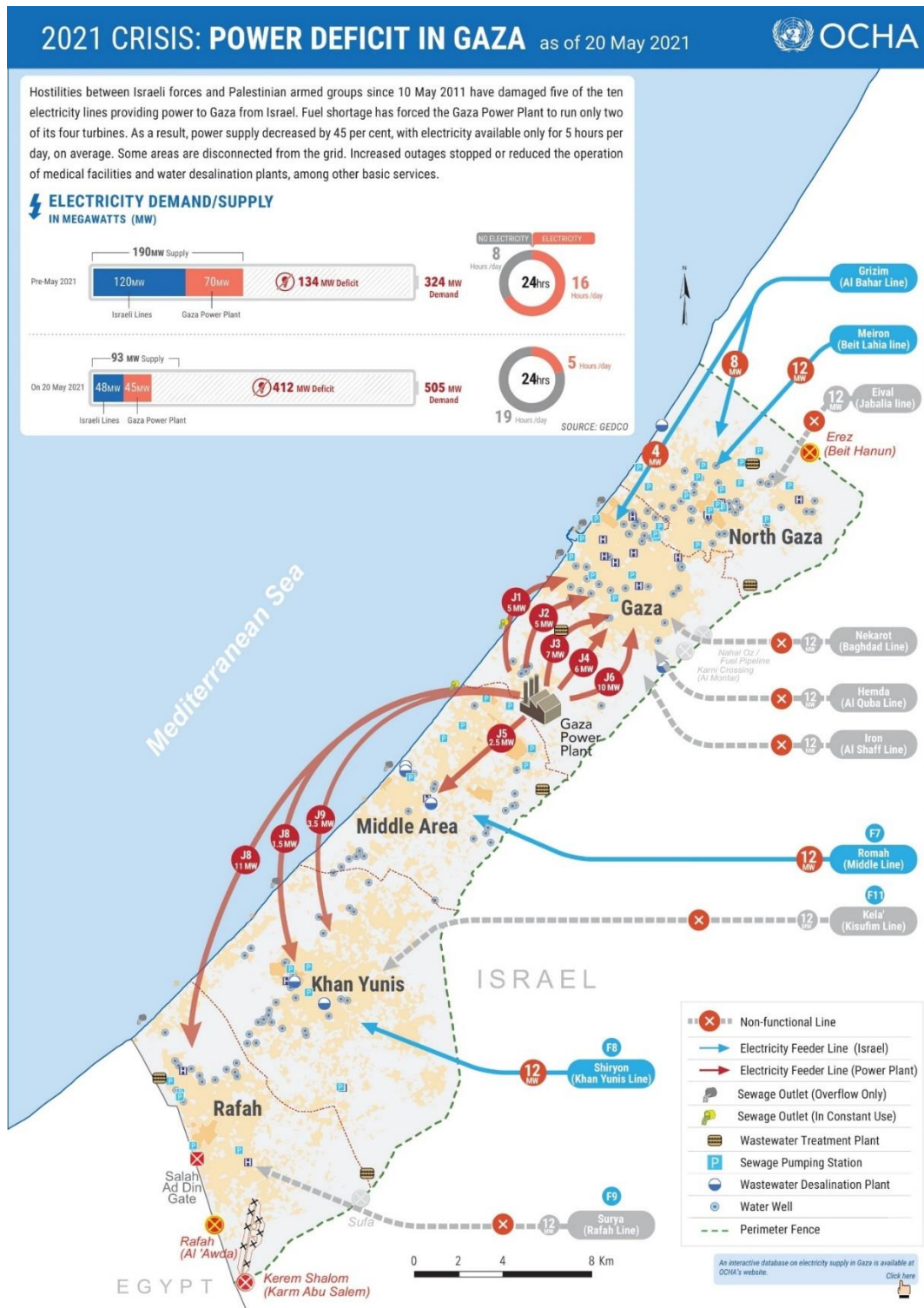


“There is no place in Gaza unaffected by power cuts” (Key informant, Municipality)

The following map provides some insights into the power deficiencies and cuts in the Gaza Strip according to governorate, as well as highlights the main power lines feeding into the Strip³²:

³² Office for the Coordination of Humanitarian Affairs (OCHA), *2021 Crisis: Power Deficit in Gaza*, May 20th, 2021. (https://www.ochaopt.org/sites/default/files/electricity_power_may_2021.pdf)

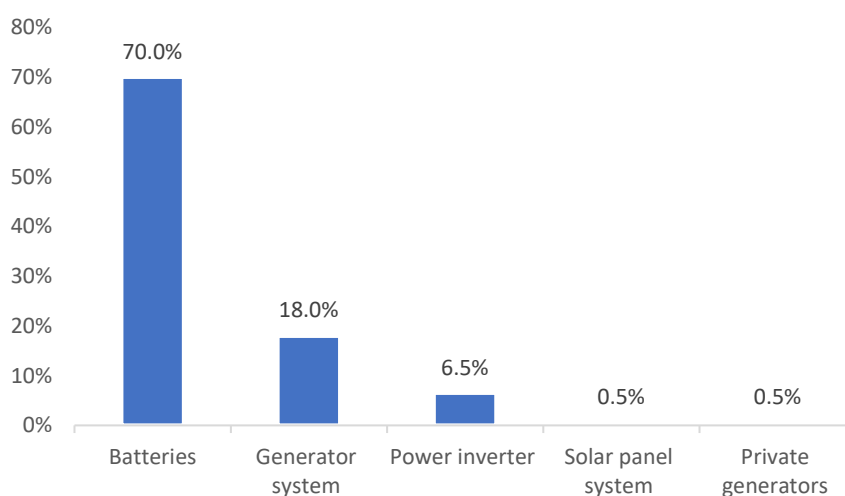
Figure 9: Power deficit in Gaza: OCHA, 2021



Consequently, most of the households in Gaza Strip (96 percent) managed to secure access to an alternative source of energy to alleviate the effects of the outages. The majority (70 percent) use batteries to power up simple LED lights to illuminate their houses, as it is difficult to carry out chores or for students to study in the dark. This is especially true in winter when the daylight period is shorter.

(18 percent) of the household respondents have a subscription to a private generator service, which is a solution on a building-by-building, neighborhood or communal level. It must be noted, however, that these tend to be expensive and can only cover some very basic power needs. The prices of these services are informal with no pricing systems in place. It was reported in the interviews that the connection might cost more than 100\$ and the prices range from 2.7 to 4.5NIS per kilowatt (0.85\$ to 1.4\$ depending on region and provider; which is much higher than the price for electricity from the network which is about 0.17\$)³³. They are also reported to contribute to population and noise. An even more expensive option is owning a power inverter, whereas (6.5 percent) have access to this option. Very few people have independent alternate sources of power, such as a solar panel system (0.5 percent) or private generators (0.5 percent).

Figure 10: Access to alternate energy sources



When electricity is available, the majority (61 percent) find its consistency to be satisfactory or somewhat satisfactory. In contrast, 39 percent find it unsatisfactory or somewhat unsatisfactory. Only (25 percent) are either satisfied or somewhat satisfied with their power prices, with (48.5 percent) indicating that they are either unsatisfied or somewhat unsatisfied. As indicated in various parts of the report, the inconsistency, reliability and quality of electricity supply negatively impacts all aspects of the lives of Palestinians in Gaza.

Electricity and Health

The electricity crisis in the Gaza Strip has had an effect on every area of life, including the health and physical well-being of the populace. (12.5 percent) report that their doctor or hospital visits have been delayed often or sometimes due to a lack of power. From their side, hospitals report that although they receive priority power access, there are still significant shortages to their service capabilities. While hospitals have limited numbers of electric voltage stabilizers, their equipment are highly vulnerable, and are damaged or even destroyed by the frequent cuts in power, as well as the alternating pressure strength throughout their circuits. The purchase of new and modernized equipment is complicated by import restrictions as well. Dialysis machines in particular are vulnerable to this, leaving many patients with no option other than getting less frequent treatments and worsening their health conditions. All of these challenges have created a long backlog of medical procedures affecting the most-neediest of medical attention.

³³ <http://www.pipa.ps/page.php?id=2312c7y2298567Y2312c7>

This has led to the prioritization of some procedures and the neglect of others. Doctors speak of panels where they decide which patient gets treatment and which will not.

“We needed to form a panel to determine who gets to live and who has to die” (Key informant, Ministry of Health -Gaza)

The COVID-19 outbreak made matters worse, as this meant more equipment was needed, and more pressure on an already exhausted medical system. Additionally, the power crisis has virtually terminated any kind of research and development in the medical sector.

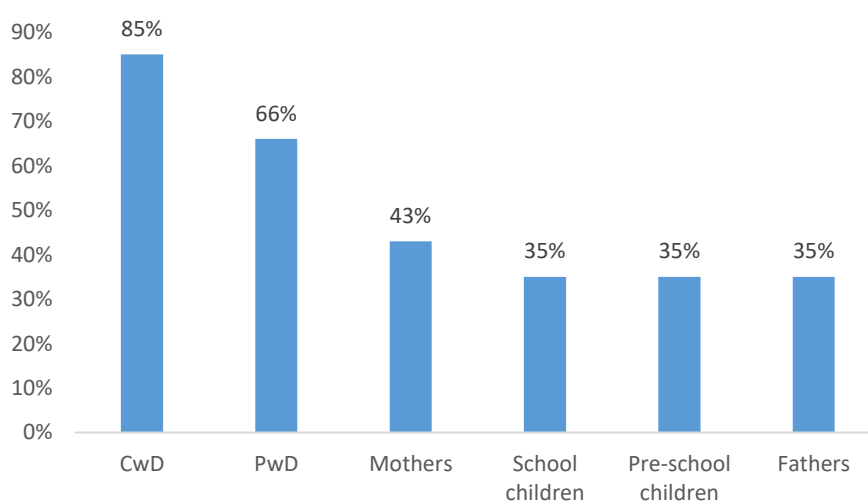
“If we can’t provide basic services, how can we even begin to think about development” (Key informant, Ministry of Health - Gaza)

Not only has the power crisis affected treatment, but also the general health of Palestinians in Gaza. The survey shows that 13.5 percent of the heads of households indicate that the crisis has made it easier to catch water-borne diseases. This is a result of their inability to treat water, and the malfunction of pumps which caused sewage water to flow into the streets. The lack of heating in the winter has contributed to causing pneumonia, especially among children.

Against that backdrop, 5.5 percent of the household respondents indicate that their children have suffered from dehydration either often or sometimes. While, 6 percent said that pollutants from power generating alternatives have harmed their health either often or sometimes. Only 4 percent indicate that their vaccination has been delayed due to power cuts.

The effects of the electricity crisis on the physical health of Palestinians in Gaza were not perceived to be the same across all groups. Respondents were asked if they agreed that the electricity crisis affected the health of various members of their families and different groups in society. As the table below shows, respondents did not perceive everyone to be equally affected. The most negatively impacted are children with disabilities, with 85 percent of households with PwDs reporting such a negative impact. They are followed by PwDs in general, with 66 percent reporting such a negative impact.

Figure 11: Percentage of families reporting that the physical health of following members was negatively impacted



“I am no longer able to help my wife with the chores, as I cannot stand for more than 5 minutes after losing my leg. Everything is manual, I cannot simply put clothes in the washing machine.”
(Male, PwD, Gaza city)

According to a key informant (Ministry of Health), the impact of PwDs has additional dimensions:

“PwDs are less able to help themselves or cope with daily life, as they cannot manually do many of the chores which were previously done with the aid of electric devices, such as washing clothes. Deaf respondents who depend on lip reading cannot communicate with others when it gets dark and in the absence of a light source, they tend to isolate themselves from others more.”

The qualitative data reveal that while all the negative impacts stipulated throughout the report affect children with disability, additional dimensions must be noted regarding children with disability:

- *My child has a physical and visual disability and already has difficulties accessing the school system; electricity cuts makes it difficult to charge his electric wheelchair, work on the special IPAD that was donated to him by an NGO; his motivation to go to school continues to dwindle.” (Mother, with a child with disability, East of Gaza city)*
- *Our child has a severe neurological and mental impairment; we were able to secure an electronic bed that helps her move, sit up and generally do exercise. When the electricity is not on, his body is standstill and begins to develop bedsores that are slowly and painfully killing her.” (Father, child with disability).*

The ability to obtain pre- and post-natal health was negatively impacted 53 percent of pregnant women. Lactating women were impacted at a higher level (66 percent of them) by the electricity crisis. The data also confirm that the mental health of pregnant and lactating women was most impacted by the electricity outages, as 77 percent of them report that.

PwDs are followed by women, especially pregnant and lactating. In general, 43 percent report that the physical health of mothers was negatively impacted. The ability to obtain pre- and post-natal health was negatively impacted 53 percent of pregnant women. Lactating women were impacted at a higher level (66 percent of them) by the electricity crisis. With that, 71 percent of women report that the crisis negatively affected their ability to take care of their newly born children, and 54 percent reported a negative impact on the regularity of breastfeeding. The following testimonies illustrate the impacts and challenges faced by mothers:

“I had a difficulty breastfeeding my child consistently because of my work; so, I had to save milk in the fridge for my other family member to feed the baby. This was unfeasible as my saved milk was ruined many times because our fridge was not supported by electricity” (Mother, Gaza City)

“After all of my births, I would get heat waves in my body; they are painful and uncomfortable. Not having any type of air conditioning was always making me nervous and uncomfortable breastfeeding. I just wanted for all it to go away” (Mother, Jabalya)

WATER AND HYGIENE

The sector of water and hygiene is also negatively impacted by the electricity crisis. The vast majority (87 percent) of respondents said that they suffered from water cut-offs either frequently or sometimes. Only (2.5 percent) said they have been immune to such a phenomenon. Consequently, (60 percent) indicated that they are often or sometimes unable to clean their dishes, or to clean their house (53.5 percent), or to even wash their clothes (67 percent). The lack of water also affects their ability to pump sewage water, as (9.5 percent)

say this happens frequently, and (20.5 percent) say it occurs sometimes. (18 percent) of respondents were frequently unable to maintain their personal hygiene through showers or baths due to lack of electricity, while (32.5 percent) said that they sometimes couldn't.

There are often conflicts with the unsystematic water schedule in Gaza, which makes utilizing the water much more difficult without the ability to pump the water into the houses. This is especially true for large residential buildings or skyscrapers.

NUTRITION

The effects of power shortages were also felt when it came to the nutrition of the respondents, as the majority of them (65 percent) have been facing difficulties adopting healthy eating systems due to a lack of cooling and freezing. Malnutrition affects (17 percent) of the respondents either often or sometimes. There are some variations in the ability of respondents to provide multiple meals a day for their children. (26.5 percent) of the respondents said that they can offer 3 meals a day for their children, while (18.5 percent) provide two meals, and (28 percent) say they offer only one. These numbers change significantly when the parameters are changed to reflect cooking meals with fresh produce. In this case, (4.5 percent) of the respondents indicate that they are unable to provide any meals whatsoever with fresh produce for their children, and the majority (56 percent) can only provide one. (9 percent) can provide two, and only (6 percent) can offer three. As a result, (24.5 percent) of the respondents answered that they often resorted to eating canned food as an alternative to perishables or fresh produce, and (36 percent) indicated that they sometimes resorted to this.

Many of the respondents indicated that buying food in bulk is much more economical for them, however, since they cannot store them in proper conditions which require electricity, they must spend more money to feed their families, which created additional challenges. An indirect effect of the electricity crisis on health and nutrition is that it reduced the quality of food consumed by the people of Gaza, as they cannot afford to continuously purchase fresh food due to a lack of refrigeration. Consequently, they rely more on prepared food and foods which do not need refrigeration.

“Electricity even affects the caloric intake of people in Gaza” – Male, Cancer patient in Gaza

Figure 12: Number of meals served to the children per day

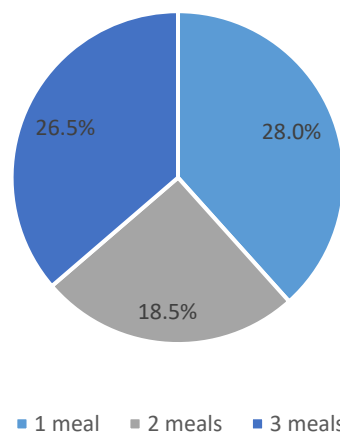
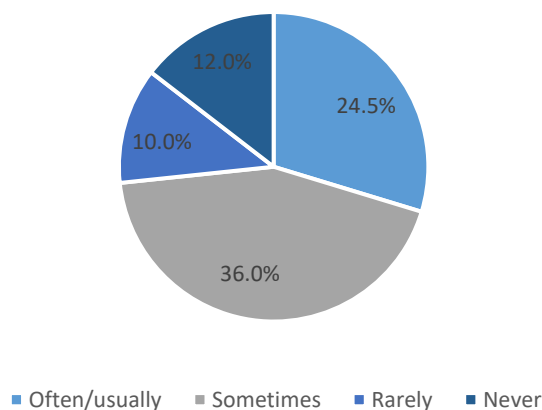


Figure 13: Eating canned food as a substitute to fresh food



PSYCHOLOGICAL HEALTH AND SAFETY

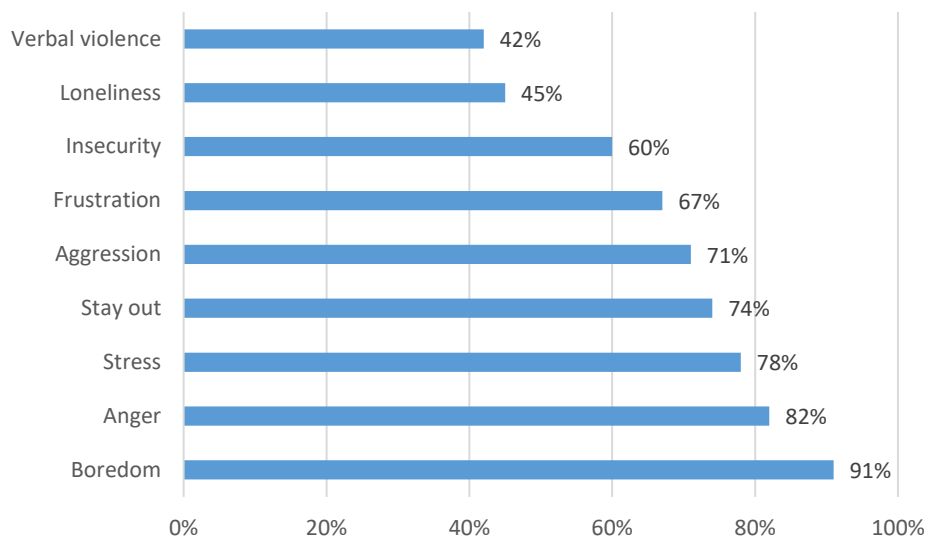
The links between economic hardship, stress and domestic violence have been well established by many studies. Gaza is no exception to this, as the electricity crisis contributes to increasing stress and financial instability. (50.5 percent) of respondents say that the electricity crisis often or sometimes increases their mental stress. This can translate into an increased level of domestic violence, where the survey shows correlation between access to electricity and levels of violence (as indicated below). In general, as much as (27 percent) of the parents report heightened levels of domestic violence in their families in association with parental stress. (15 percent) found that verbal violence also increased. Many respondents indicate that their children are fighting and resorting to violence more frequently as a release for built-up stress.

Frequent electrical outages also mean that tasks and duties at home become harder to manage. (40 percent) of respondents indicated that this crisis has frequently increased their burdens at home, while (31.5 percent) said that it sometimes increased their house burdens. Children are also often called upon to contribute to alleviating the increased amount of housework, whereas approximately (30 percent) of respondents indicated that children had increased house burdens. There is little difference between male and female children.

The need to complete all the chores of the day in a small window of time creates a large level of stress, especially for women in the family who are asked to balance cooking, cleaning the house and helping the children study all in the small period of time when the power is on. This means that women cannot simply rest when they want to, as they are sitting in anticipation of the power situation, and must stay up until the early morning when the power is on. Many respondents agreed that this caused tensions with their children, as they would fight more often with them.

The data show that the electricity crisis has significantly affected the mental health of children in so many ways. As the following figures shows the most prevalent negative mental and psychological impact relates boredom among children, followed by anger, mental stress, tendency to staying out of the home, aggression, and frustration. Caregivers also report other prevalent feeling among children including insecurity, loneliness and verbal violence.

Figure 14: Percentage of caregivers reporting mental/emotional negative impacts on children as a result of electricity outages



The economic crisis exacerbates mental health challenges. For example, (81 percent) of respondents either strongly agreed or agreed that the additional financial burden affected their mental health. (77 percent) reported the same for their spouse, and (49 percent) for their children. (54 percent) of respondents indicated often facing difficulty sleeping due to lack of any type of air conditioning, and (21.5 percent) report that they sometimes face difficulty sleeping. This also affected students who were unable to attend their classes, tests or do their homework.

“One time my daughter’s test at the university coincided with a power cut, and she almost had a mental breakdown trying to find an alternative source of power so she can attend it online” – woman employee in Gaza

Only 4 percent experienced an accident due to alternative sources of light or power like candles, however, in half of those cases children were injured. Many accidents have happened in the Gaza strip related to power, the biggest culprit being a malfunction in the wires of generators which are improperly set up. The use of candles has become less frequent in Gaza after many accidents, but a large amount of improper electric solutions and unsafe alternative sources remain. For instance, generators are prone to explosions when improperly utilized. Furthermore, the power crisis has lessened the efficiency of the fire department, as they are unable to properly prepare their equipment, or even fill out basic paperwork to serve the citizens. The Israeli siege has also prohibited the import of many items that could help alleviate some issues resulting from alternative power sources, such as devices to detect gas leaks.

The power outage also affected leisure time for children, as (40 percent) of respondents said that children often or sometimes had less play time due to power cuts. Similarly, (41.5 percent) reported the same for participating in extracurricular activities. Decreased levels of watching TV were reported by respondents, (35 percent) stating that this decrease occurred often, and (20 percent) saying sometimes.

Electricity and Income

Electricity is vital for many jobs; this could range from operating machinery to being able to communicate online with clients. (24 percent) of those whose jobs rely on electricity said that their income was often

negatively impacted by power cuts, (17 percent) said that it was sometimes negatively impacted. This is reinforced by the majority view (60 percent) which either strongly agreed or agreed that the electricity crisis has caused an economic burden on the people of Gaza. A respondent indicated that his laptop can only function for 2-3 hours a day without power, and this has cut down his productivity down to a third, to where he cannot honor his work agreements.

Even for those who do not rely directly on electronic devices for their job, the average needs to spend more on alternative sources of power. Even the most economic options such as batteries with LED lights cost 400-600 NIS, and they need maintenance and replacement after a period of time which can cost hundreds more NIS. Generators are even more expensive, and cost approximately 1200 NIS to purchase, and 6 NIS in fuel per hour to operate. Inverters are even more out of reach of the general populace, costing between 3000 NIS and requiring yearly maintenance and replacements of around 1000 NIS at least. Solar power panels cost 7000 NIS and are very rarely afforded.

Some respondents explained that they had to cancel their plans to start small supplemental income projects because they needed to divert their resources towards alternative power sources.

“We wanted to grow trees and raise birds to supplement our income, but we had to stop that because their costs went towards alternative energy sources” – male employee in Gaza

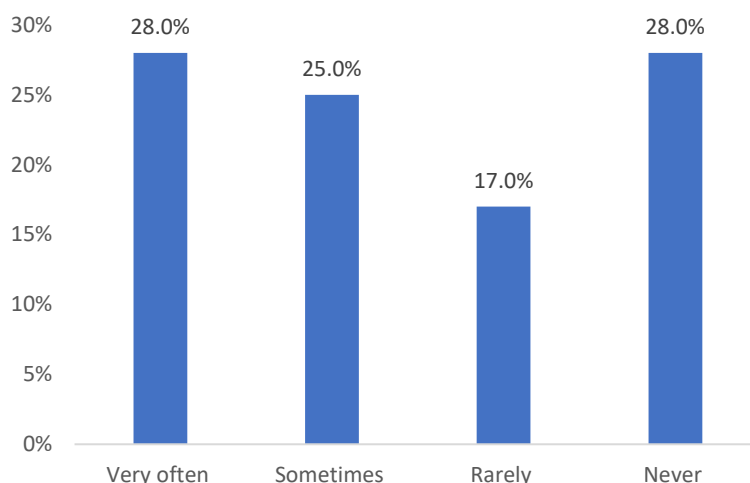
The vast majority (81 percent) of respondents strongly agreed or agreed that this economic burden makes it difficult to provide good quality food for their families, as was touched upon in the section above. Similarly, (70 percent) strongly agreed or agreed that the increased financial burdens make it difficult to provide proper living conditions. Many more expenses are now seen as luxuries that must be postponed in order to buy more electricity access, a notable example of which are new clothes.

Electricity and Education

Palestine is a young society, with youth and students making up a large bulk of the population. This means that the issues faced by this demographic group affects a large percentage of all Palestinians. As with any other sector in Gaza, education was not spared the negative impacts of the electricity crisis.

(28 percent) of respondents indicate that power cuts at schools very often, while (25 percent) say that it sometimes cuts out. (17 percent) found that it rarely cut out, and (28 percent) said that it never does. These numbers are reflected in the percentage of respondents (46 percent) that say that students often or sometimes attend class without a light source. (36 percent) said that students had to often study early in the morning or late at night due to power cuts, and based on the electricity schedule. (27 percent) said that they sometimes needed to change their study schedule. (23 percent) of respondents reported having sent their children to the neighbors to study due to a lack of power at home.

Figure 15: Electricity cut off at school



Approximately half of the respondents have seen certain classes cancelled due to power cuts, such as labs or other activities that require electricity. (65 percent) report that there is no heating in class due to power cuts either often or sometimes, and relatively similar numbers (70 percent) say the same for cooling.

Overall, most (55 percent) agreed that electricity outages have an impact on the quality of education. This has exacerbated issues already facing the education sector in Gaza, such as truancy and student drop-out. This disproportionately affects male students, where (17 percent) of respondents reported that male students had a tendency to drop out often or sometimes. This is a higher amount when compared to female students, where (11.5 percent) of respondents indicated that female students often or sometimes had a tendency to drop out due to electricity issues.

The effects of Covid-19 have pushed much of the education process online, which makes power outages a critical issue affecting the education of Palestinian youth. (73 percent) reported that students are often or sometimes unable to attend online classes, or use technological methods for learning (67 percent).

A further aspect is that the power crisis has reinforced class privileges, as relatively better-off students who have access to alternative sources of power are able to more consistently attend class, do homework, and exams. This has further widened the gaps between the different economic groups in Gaza.

“Not all families can afford alternative energy in Gaza, which creates a grades gap between the different classes” – School Supervisor for Ministry of Education in Gaza

Variance between households with lower and higher access

Although all Palestinians in Gaza are significantly suffering from power outages, not everyone in the Gaza Strip has similar conditions, and certain groups possess relatively better access to electricity than others. In order to help draw a relation between the limited and inconsistent electricity and the deterioration of living standards and health in the Gaza Strip, we divided the surveyed households into two groups based on the number of hours of power received, as well as its quality and affordability. The results broadly confirm that lesser access and lesser quality of electricity were correlated with worse situations for people in Gaza when compared to those with better access. Please note that we are speaking in the relative sense here to compare

between people's in Gaza access to electricity, as even the relatively better off group still receives limited electricity.

In general, those with relatively less access to electricity tended to be women (57 percent), while women comprised (46 percent) of the group with relatively better access to electricity. The group with less access had a higher representation of refugees (81 percent), and tended to live more in refugee camps when compared to the other group (28 percent) vs (16 percent).

The general access to health services of those with less access to electricity was similar to those with more access to electricity, this is likely due to health centers having somewhat similar electric prioritization across the Gaza Strip, and each center serving a wide segment of the population. However, those with less access to electricity tended to have slightly higher cases of water borne diseases due to a lack of sterilization of water. They also tended to be more dehydrated than the other group (7 percent vs 4 percent), and provided less meals to their children. Additionally, these meals relied more on canned food over fresh produce. However, these differences are not significant, and fall within the margin of error.

In the vast majority of cases the group with less access to electricity faced more troubles related to WASH activities. They were more frequently faced with water cut offs, and report being unable to clean their kitchen and dishes, as well as being unable clean their house, clothes or take showers more frequently than the other group. Similarly, they are more frequently unable to pump sewage water as often as needed (12 percent vs. 8 percent). There was a statistically significant correlation in the inability of those with less access to electricity to bathe or shower, and maintain their own personal hygiene. Similarly, those with relatively less access to electricity were less able to clean their houses. The group with relatively less access to electricity reported that they were more likely to have bad smells in the bathroom due to a lack of water to clean. This result was at the cusp of statistical significant (0.058) but nonetheless not significant for our margin (0.05).

Psychological health and safety are the area where the difference between the two groups becomes very stark. The group with less access to electricity reports much higher levels of domestic violence against children (40 percent) compared to (20 percent) among the other group. This was a statistically significant difference between the two groups. The burden for housework is higher for the low access group, and it is notable that male children are given more house burdens than in other higher access households. Children have less time for play, and also less time to pursue extracurricular activities.

On the emotional level, households with less access to electricity constantly reported higher degrees of negative emotions. This included relatively higher levels of mental stress (25 percent vs. 14 percent), frustration (20 percent vs. 11 percent), loneliness (10 percent vs. 5 percent), insecurity (25 percent vs. 10 percent), aggressiveness (22 percent vs. 14 percent) and verbal violence (10 percent vs. 2 percent), whereas respondents with low access to electricity reported feeling the above "frequently or often". The difference in degrees of verbal violence between the two groups was statistically significant. One of the parents elaborated on the negative emotional feelings that are endured by the children:

"Now children have more access to technology and the world and they need electricity to access the world around. In Gaza, this is even more critical as there is almost zero access to visit the world. Our children keep asking one question: Why us? Why do we see lights on the boarders and know that the Israelis and our brothers in the West Bank are enjoying their life to the fullest with electricity? My son keeps saying that hates the whle world, and he vents his anger on us and on his sibilings. I must keep my emotions in check as I am unable to

answer most of his questions, not am I able to get him the electricity that makes his life easier and his access to learning and epuration possible.” (Mother, Nusairat)

Regarding income, those with less access to electricity were more likely to report a decrease in daily allowance (15 percent vs. 7 percent). Similarly, they were more likely to strongly agree or agree that the power crisis was a financial burden on them (65 percent vs 55 percent). Those with less access were more likely to strongly agree with the statement that they are less able to provide good living conditions to their family when compared to those who have relatively more access to electricity (49 percent vs 41 percent).

Education is also an area which saw differences between those with relatively more and relatively less access to electricity. For instance, the children of those with less access to electricity tended to study less hours (2 vs. 2.36 hours), and report more frequently that their quality of study was negatively impacted (26.5 percent vs. 20 percent).

The table below illustrates the statistically significant differences between the two groups:

Table 5 Statistically significant differences between those with relatively more and relatively less access to electricity in the Gaza Strip

Indicator	Value	Significance (<0.05)
Increased domestic violence	11.791	0.019
Increased verbal violence	10.375	0.035
Inability to bathe	10.084	0.039
Inability to clean house	8.101	0.044
<i>Bad smells in bathrooms</i>	<i>9.147</i>	<i>0.058*</i>

**At the cusp of statistical significance, but not strictly significant according to our criteria.*

The results indicate that there is a statistically significant correlation between access to electricity and welfare in two general areas:

- 1) WASH.
- 2) Domestic violence and mental health.

Operating water and sewage pumps using electricity had a detrimental effect on the hygiene of people in Gaza, as it severely limited the access to water. Consequently, it is more difficult to maintain personal hygiene without bathing, and cleaning the house is often neglected. WASH indicators also tie directly to health, and other indirect indicators or problems that stem from deficiencies in WASH.

Similarly, all the negative effects of electricity cuts elaborated above have led to a statistically significant increase in both domestic and verbal violence for the group with relatively less access to electricity. This largely follows world trends which indicate that increased levels of stress and economic anxiety lead to more violence within the household, especially targeting children and wives. This also has a spillover effect into other areas of mental and physical health.

Ultimately, there is evidence that access to electricity has an effect on the well-being of the people in Gaza. These findings serve to open the door to a deeper discussion, and warrant further investigation into the effects the electricity crisis, and how it continues to create new challenges for the people of Gaza.

Recommendations

According to experts and based on desk review analysis during this assessment; the main root cause of the power crisis in the Gaza Strip is tied to the Israeli occupation and siege. In addition, every war that has taken place since 2008 has had huge impacts on Gaza Strip's infrastructure, including power, which has made it very difficult to rebuild. This electricity crisis has many impacts on multiple sectors, as it affects every area of life. Every citizen in the Gaza Strip has been impacted directly or indirectly as a result of the power outage and was deprived from one of the most basic necessities of life. Al Mezan and others human rights organizations have been calling on the international community to urge Israel to stop its discriminatory policies targeting Palestinians, to repair the main electricity lines and to allow the entry of fuel and other aid into Gaza. In addition, the Palestinian Energy and Natural Resources Authority (PENRA) has been working to reform the sector, as well as increase the electricity supply and promote the use of solar energy. It is also aspiring to promote the culture of payment of bills by a significant percentage of the population to cover expenses³⁴.

As explained above and based on the results of the survey as well as the feedback from household members and experts within the Gaza strip; JPF and other similar organizations should strive to support the alleviation of this crisis, both financially and technically, and they can consider the following recommendations in terms of their programming:

Advocacy and Awareness

- **Policy level**
 - Advocate to end the blockage on Gaza Strip and ease the transfer of materials, including fuel, and other necessary equipment to rebuild the power grid.
 - As Israel bans any material which it considers could be of dual use, advocate to allow the entrance of alternative energy resources to the Gaza Strip. In addition to health care equipment and devices impacted by power outage.³⁵
- **Operational level**
 - Support projects and efforts to increase the coordination within the electricity, education and healthcare sectors and strengthen the cooperation between NGOs, INGOs, CBOs and government institutions.
 - Support projects that aim to work with and enhance the governmental institutions and models in order to provide electricity services.
 - Continue to support the comprehensive model of service provision as opposed to one stand-alone service.
 - Support programs with long term objectives and plans rather than short term projects in order to enhance sustainability and impact. The design of programs should consider the humanitarian-development (H-D) nexus approach which focus on developmental aspects in addition to immediate humanitarian assistance aspects.

³⁴ For more on PENRA's actions, please refer to <http://www.penra.gov.ps/>

³⁵ For a partial list of banned items for import into Gaza, please consult this list: (https://embassies.gov.il/MFA/FOREIGNPOLICY/Peace/HUMANITARIAN/Pages/Lists_Controlled_Entry_Items_4-Jul-2010.aspx)

- Encourage the use of alternative sources of energy and engage the private sector in the provision of alternative energy sources and investments.
- Create awareness regarding the different safe energy alternatives.
- Advocate for better working conditions for mothers and flexible timing that accommodates for electricity shortage.
- Advocate for the adoption of a different electrical system, a hybrid system as mentioned by one of the experts, that aims to reduce the cost and provide the needed power to citizens.
- Invest in further research on the impact of electricity on households and specific groups. In addition to research on health- friendly alternative resources of energy in the Gaza Strip.
- Involve the public, the private sector and universities in the research on electricity impacts and alternatives.
- Increase support to projects focusing on community awareness regarding the hazards of the electricity crisis and the alternates utilized.
- Increase support to projects focusing on community awareness regarding the impact of the electricity crisis on the mental health of children, PwDs and women.

Health

- Increase funds to projects targeting the health and nutrition of pre-school children.
- Increase support to projects targeting pre- and post-natal health, which were hindered by the electricity crisis.
- Continue to support the projects focusing on malnutrition, and continue to adopt a comprehensive approach to these services working with parents, communities and KGs both on technical aspects as well as on awareness-raising and capacity building.
- Identify, seek out and support specific segments of children who are not usually targeted by projects and interventions. An example is children with burn injuries due to fires caused by electricity outage, and children who developed other physical and mental problems due to the electricity crises.
- Provide support to children with mental health issues. Support can be focused on education (i.e., special education), specific nutrition systems, social integration and community awareness-raising towards them.
- The provision of assistive devices to PwDs, especially those that get delayed on the borders due to the political situation, as well as assistive devices and supplies that constantly need replenishment due to electricity cut off.

Mental Health

- Support projects that target mental health in general in the Gaza Strip and that aim to increase the capacity of the mental healthcare sector in particular (i.e., increasing the number of service providers).
- Support projects that aim to build the capacities of mental health staff.
- Support projects and efforts to increase the coordination within the mental health sector.
- Support projects that target the mental health of women.
- Support projects which aim to find alternative coping mechanisms to daily stress which do not rely on electricity.

Education

- Support schools and projects in providing supporting devices for student learning that enables them to accommodate to power cuts.
- Support projects that aim to build the capacities of social workers in schools to support students in coping and addressing the impact of electricity shortage.
- Support projects focusing on learning development and innovative teaching approaches that take into account the inability of students to study during power outages and reduces the number of hours of studying outside the school.
- Increase funds to projects targeting PwDs in schools as they were found to be one of the main groups impacted by the electricity crisis.

Bibliography

1. African Academic Research Forum. 2014. "Rethinking Teaching and Learning in the 21st Century". September 2014. <https://aa-rf.org/wp-content/uploads/2019/04/saice-2014-proceedings.pdf#page=11>
2. Al Mezan Center for Human Rights, 2020. <https://bit.ly/3pf7YYF>
3. Al Mezan Center, 2021. "The reality of the Economic, Social and Cultural Rights" <https://mezan.org/uploads/files/161607903255.pdf>
4. Aljazeera, 2017. "The Electricity Crisis in Gaza ... Another Dark Side of the Siege". 13 June 2017.
5. DCI, 2020. Gaza's Electricity Crisis Claims Another Three Palestinian Children.
6. ESMAP, *Household Energy Access for Cooking and Heating: Lessons Learned and the Way Forward*. 2011.
7. International Journal of Behavioral Development. 2008. "Child Development and Family Mental Health in War and Military Violence: The Palestinian Experience". <https://sci-hub.hkvisa.net/>
8. Irwin, Bridget R., Klesta Hoxha, and Karen A. Grépin. "Conceptualising the effect of access to electricity on health in low-and middle-income countries: a systematic review." *Global Public Health* 15.3 (2020): 452-473.
9. Monna, Sameh, et al. "A Comparative Assessment for the Potential Energy Production from PV Installation on Residential Buildings." *Sustainability* 12.24 (2020): 10344.
10. OCHA, 2021 *Crisis: Power Deficit in Gaza*, May 20th, 2021 (https://www.ochaopt.org/sites/default/files/electricity_power_may_2021.pdf)
11. OCHA, *Electricity in the Gaza Strip*. 2022. <https://www.ochaopt.org/page/gaza-strip-electricity-supply>
12. OCHA. 2014. "Electricity and water infrastructure severely damaged during hostilities." The monthly Bulletin |August 2014. <https://www.ochaopt.org/content/electricity-and-water-infrastructure-severely-damaged-during-hostilities>
13. OCHA. 2021. "Statement by United Nations Humanitarian and Resident Coordinator in the occupied Palestinian Territories, Lynn Hastings". 15 August 2021. <https://www.ochaopt.org/content/it-s-back-school-12-million-children-palestine-they-deserve-security-safety-and-hope-statement-united-nations>
14. OXFORD and The American Public Health Association. 2008. "War and Public Health". <https://bit.ly/358vXBL>
15. PCBS-UNFPA Joint Press Release on the occasion of World Population Day, July 11th, 2021. <https://palestine.unfpa.org/en/news/pcbs-unfpa-joint-press-release-occasion-world-population-day>
16. Save the Children, 2017. Gaza: 1 Million Children Suffering in 'Unlivable' Conditions.
17. The American Dietetic Association. 2007. "Water and Food Safety in the Developing World: Global Implications for Health and Nutrition of Infants and Young Children". November 2007. <https://sci-hub.hkvisa.net/10.1016/j.jada.2007.08.013>
18. UNDP. 2017. "Right to Education in the Gaza strip". May 1 2017. <https://www.ps.undp.org/content/papp/en/home/presscenter/articles/2017/05/01/right-to-education-in-the-gaza-strip.html>
19. UNICEF. 2016. "Children in Gaza design their dream school". 14 December 2016. <https://www.unicef.org/stories/children-gaza-design-their-dream-school>
20. UNICEF. 2018. "Nearly 25 per cent of boys aged between 15 out of school in the State of Palestine". 26 July 2018. <https://www.unicef.org/press-releases/nearly-25-cent-boys-aged-15-out-school-state-palestine>

Annex I: Quantitative Questionnaire

Electricity Impact on Children and Mothers in Gaza Strip

Quantitative Questionnaire

Demographic details			
Sex:			
Male		Female	
Age group:			
18-24	25-40	40-65	Greater than 65
Marital Status:			
Single	Married	Divorced	Widowed
Refugee status:			
Refugee		Non-refugee	
Governorate			
1. Northern Gaza 2. Gaza 3. Middle area 4. Khan Younis 5. Rafah			
Type of living area			
1. City 2. Refugee camp 3. rural areas 4. Bedouin communities			
Do you live in the border area (Access restricted areas)			
1. Yes 2. No			
Highest level of education completed:			
Illiterate	Less than Tawjihi	Tawjihi	
Diploma (2-years of Study)	University Degree (BA)	Post-graduate degree	

Occupation:			
Self-employed (own business)	(own	Employed	Unemployed
Student		Housewife	Other, please specify: _____
If employed, which sector?			
Governmental	Private	Non-profit	Other, please specify: _____
In general, how do you assess your economic condition in comparison to your surrounding community?			
Below average	Average	Above average	
Respondent's Relationship with the household head:			
Self	Husband	Mother	Daughter
Wife	Father	Son	Other, please specify: _____

What is the average monthly use of water (in liters) for household purposes? (Please check you last invoice)

--

What is the average monthly use of clean (drinkable) water (in liters) for drinking?

--

What is the average monthly spend of water (in shekels) for household purposes? (Please check you last invoice)

--

What is the average monthly spend (in shekels) of clean (drinkable) water for drinking?

--

--

--

Household details			
Who is the head of the household?			
Father	Mother	Son	Daughter
Other, please specify: _____			
Sex of the head of the Household			
Male		Female	
Family size (# of family members living in the household)			
Male: _____	Female: _____	Total: _____	
Less than 5 years: _____	5-15 years: _____	15-25: _____	
25-40: _____	40-65: _____	Older than 65: _____	
Highest level of education completed for the head of the Household :			
Illiterate	Less than Tawjihi	Tawjihi	
Diploma (2-years of study)	University degree (BA)	Post-graduate degree	
Number of children in kindergartens and nurseries (pre-school) less than 6 years old: -----			
Number of children in school: -----			
Number of students in university/college: -----			
Number of children who dropped out of school (before 10 th grade):			
Males: -----			
Females: -----			
What is the total size of your living space (in square meters)?			

People with disabilities

Does anyone in the family have a disability?

1. Yes 2. No

If yes, who and what kind of disability?

Family member (father, mother, son, daughter)	Age	Mobility	Visual	Hearing	Mental	Other

Does the member/s with disability need assistance that requires electricity?

Yes, please specify the kind of assistance/device: -----

No

If yes, is this member/s access to this assistance impacted by the electricity crisis/availability in the house?

1. Yes 2. No

ELECTRICITY STATUS IN THE HOUSE

What is the number of hours of electricity that your family gets from the main network? (Daily average during the last week)

1. Zero (no electricity) 2. 1-4 hours 3. 5-6 hours 4. 7-8 hours 5. More than 8 hours

Does your family have alternative sources of electricity when the main network's service is out?

2. Yes 2. No

If yes, what are the sources of alternative electricity? (Please select all used sources)

1. Inverter 2. Private generator 3. Public generator (by subscription) 4. Home solar energy system
5. Other: _____

How do you assess your electricity supply?

Consistency of supply when the electricity is available	Satisfactory	Somewhat satisfactory	Somewhat unsatisfactory	Unsatisfactory	N/A
Affordability of your electricity supply	Satisfactory	Somewhat satisfactory	Somewhat unsatisfactory	Unsatisfactory	N/A
What is the average amount your family spends on electricity on a monthly basis (such as main network fees, fuel for generator, subscription for generator, solar energy costs, etc.)? -----ILS					
EDUCATION					
At schools					
How often do children in the family experience the following?					
	Often/usually	Sometimes	Rarely	Never	N/A
Electricity cut off at school					
Attending classes without lighting					
Cancelling classes that need electricity (e.g., lab)					
Inability to use heating systems (e.g., central heating if available at school)					
Inability to use cooling systems (e.g., fan, air conditioning)					
Inability to use technological devices and methods in learning (e.g., computers, tablets, internet, etc.)					
At home					
How often do children in the family experience the following due to electricity cut offs or shortages?					
	Often/usually	Sometimes	Rarely	Never	N/A
Inability to keep up with daily homework					
Inability to study for tests/exams					
Inability to use technological devices and methods in learning (e.g., computers, tablets, internet, etc.)					
Inability to participate and attend online classes during Covid-19 home school period					
Having to study during early morning or late night					

hours due to electricity's availability limitations					
Study quality being impacted due to the quality of electricity supply					
Tendency of male children to dropout					
Tendency of female children to dropout					

HEALTH

During the last three years, did you suffer a fire incident (small or large) in the house due to the main supply of electricity (main network)?

During the last three years, did you suffer a fire incident (small or large) in the house due to the main supply of electricity (main network)?
1. Yes 2. No
During the last three years, did you suffer a fire incident (small or large) in the house due to the alternative sources of electricity (e.g., generators, alternative methods such as candles or fuel-based methods)?
1. Yes 2. No
During the last three years, did any member of your family suffer an injury related to the main supply of electricity (main network)?
1. Yes 2. No
If yes, were children injured?
1. Yes 2. No
During the last three years, did any member of your family suffer an injury related to the alternative sources of electricity (e.g., generators, alternative methods such as candles or fuel-based methods)?
1. Yes 2. No
If yes, were children injured?

1. Yes 2. No

How often does the family experience the following as a result of electricity shortages/cut offs?					
	Often/usually	Sometimes	Rarely	Never	N/A
Water cut offs					
Inability to sterilize water (e.g., boiling water)					
Inability to clean the dishes and the kitchen as frequently as needed					
Inability to clean the house as frequently as needed					
Inability to clean clothes as frequently as needed					
Inability to pump sewage water as frequently as needed					
Experiencing bad smell from the bathrooms due to water shortages					
Increased domestic violence (physical/verbal) against children due to parental stress					
Negatively impacted income due to having income generating activities that depend on electricity					
How often do children in the family experience the following as a result of electricity shortages/cut offs?					
	Often/usually	Sometimes	Rarely	Never	N/A
Inability to shower/bath as frequently as needed due to water pumps not working					
Inability to sleep at night due to heat and lack of cooling options without electricity					
Inability to adopt a healthy nutrition system due to lack of cooling and freezing					
Visiting the doctor or hospital and having					

treatment delayed due to electricity shortages					
Delayed vaccinations due to electricity shortages (e.g., inability to keep vaccines at the right temp.)					
Catching water-borne diseases					
Dehydration					
Malnutrition					
Being susceptible to pollutants of electricity alternatives (e.g., generators)					
Decrease in daily allowance due to income deterioration					
Eating canned food as a substitute to fresh food (home cooked)					
Dehydration due to extreme heat/water shortages					
Increased house burdens on male children due to electricity shortages					
Increased house burdens on female children due to electricity shortages					
Lower level of play time					
Lower level of participating in extracurricular activities					
Lower level of watching TV					
Having to send children to neighbors or family houses to be able to study					
How often does the mother in the family experience the following as a result of electricity shortages/cut offs?					
	Often/usually	Sometimes	Rarely	Never	N/A
Inability to get the proper pre- and post-natal services during pregnancy					
Inability to take proper care of your physical health after giving birth					

Negatively impacted your mental health (postpartum)					
Negatively impacted your ability to take proper care of your newborn					
Inability to breastfeed your newborn as frequently as needed					
Inability to adopt a healthy nutrition system due to lack of cooling and freezing					
Inability to shower/bath as frequently as needed due to water pumps not working					
Increased housework burdens on you					
Do you think children in the family suffer from the following?					
	Often/usually	Sometimes	Rarely	Never	N/A
Mental stress					
Frustration					
Boredom					
Loneliness					
Insecurity					
Anger					
Aggressiveness/violence					
Verbal violence					
Tendency to stay out of the house					
How many cooked meals do children in your family get on a daily basis?					
How many cooked meals (of fresh produce and ingredients) do children in your family get on a daily basis?					
What is the average number of study hours your children get in school days? (number of total study hours for all children in schools divided by number of children)					
What is the total number of times that your children (below 6 years old) had a fever during the last month? (number of total times for children (below 6 years old) divided by number of these children)					

What is the total number of times that your children (below 6 years old) were dehydrated during the last 6 months? (number of total times for children (below 6 years old) divided by number of these children)
What is the total number of times that your children had respiratory issues during the last 6 month? (number of total times for all children divided by number of these children)
What is the average number of times that children take a bath on a weekly basis (number of total times for all children divided by number of these children)
How many family members were diagnosed with Covid-19?
How many of them were children?

Please state your level of agreement/disagreement with the following statements:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	N/A
The electricity crisis has caused an additional financial burden on my family						
The additional financial burden impacts my ability to provide good quality food for my family						
The additional financial burden impacts my ability to provide proper living conditions for my family (e.g., heating, cooling, hygiene, etc.)						
The additional financial burden impacts my mental health						
The additional financial burden impacts my spouse's mental health						
The additional financial burden impacts my children's mental health						
The electricity crisis impacts the mental health of the mother						

The electricity crisis impacts the mental health of the father						
The electricity crisis impacts the mental health of the children in school						
The electricity crisis impacts the mental health of the pre-school children						
The electricity crisis impacts the mental health of the family members with disabilities						
The electricity crisis impacts the physical health of the mother						
The electricity crisis impacts the physical health of the father						
The electricity crisis impacts the physical health of the children in school						
The electricity crisis impacts the physical health of the pre-school children						
The electricity crisis impacts the physical health of the family members with disabilities						

Annex II: Key Informant Interview Guidelines

Studying the impact of the availability of electricity on the daily life, health and education of children in the Gaza Strip

1- In-depth interviews with people with disabilities (4-6 interviews)

Representatives from:

- Ministry of Health
- Ministry of Education
- Civil Defense
- UNICEF
- OCHA

In-depth interview questions with relevant people:

Introduction:

AWRAD is an independent and registered Palestinian center that operates in all Palestinian areas in the West Bank and Gaza Strip. At the Arab World Center for Research and Development, we are carrying out a study on the impact of electricity availability/outages on the livelihood, health, and educational conditions of children in the Gaza Strip. Your opinion is important to us and will enrich the research. The information you provide will remain confidential and will be used only for study purposes, knowing that your participation is voluntary and you have the right to participate or not.

For any clarifications, you can contact the center by calling the number available with the researcher in case of need.

1. How would you describe the impact of the power outages on daily life in the Gaza Strip? Especially on children?
2. In your opinion, has the financial burden on the family increased due to the power outage crisis? How did this affect the father, mother, and family in general? Has the economic income resulting from work (agriculture, livestock...etc) declined?
3. How did the power outage affect the provision of food (storage and purchase of food supplies, the number of meals, etc.)?
4. How has the power outage affected children's social and daily lives in general?
5. How has the power outage affected children's educational life?
6. What is the impact of electricity outages on children dropping out of school?
7. How has the power outage affected the health of children?
8. What is the impact of electricity outages on people who suffer from mental and neurological diseases?
9. What is the relation between power outage and the wastewater problem and its impact on health?
10. How do you compare the effect of power outages on the health of the father, mother, and child from a physical point of view?
11. How do you compare the effect of power outages on the health of the father, mother, and child from a psychological point of view?

12. In your opinion, does the impact of the power outage have a greater impact on children than on parents? What about children with disabilities?
13. Do you know about health conditions or diseases in children that are directly or indirectly related to the power outage?
14. Do you know about cases of fires caused by power outages? If yes like what? What was its cause? And what was the result?
15. How was the electricity outage dealt with in the past two years in light of the Covid-19 pandemic? Especially concerning children's health conditions and Online education?
16. How do parents deal with the effects of electricity outages in terms of how they deal with their children? Do you provide alternatives for them in terms of education and health? How were children with disabilities dealt with in this context?
17. What is the impact of the power outage on the services you provide? How do you deal with the lack of electricity? What alternatives do you use in your organization?
18. Do your programs include any interventions related to electricity outages or the provision of alternatives to electricity? Or dealing with the consequences of power outages, especially those related to children?
19. In terms of education and health, are there any measures you take to ensure the education and health of children in cases of power outages? 1. How would you describe the impact of the power outages on daily life in the Gaza Strip? Especially on children?

In-depth Interviews with people who have children (8 - 10 interviews)

Introduction

AWRAD is an independent and registered Palestinian center that operates in all Palestinian areas in the West Bank and Gaza Strip. At the Arab World Center for Research and Development, we are carrying out a study on the impact of electricity availability/outages on the livelihood, health, and educational conditions of children in the Gaza Strip. Your opinion is important to us and will enrich the research. The information you provide will remain confidential and will be used only for study purposes, knowing that your participation is voluntary and you have the right to participate or not.

For any clarifications, you can contact the center by calling the number available with the researcher in case of need.

1. How would you describe the impact of power outages on your daily life? Especially on your children?
2. In your opinion, has the financial burden on your family increased due to the power outage crisis? How has this affected you, your spouse, and your family in general? Has the economic income resulting from your work (agriculture, livestock...etc) declined?
3. What are the alternative sources of electricity that you use? What are its pros and cons?
4. How did the power outage affect the provision of food (storage and purchase of food supplies, the number of meals, etc.)?
5. How has the power outage affected your children's social and daily life in general?
6. How has the power outage affected your children's educational life?
7. How has the power outage affected the health lives of your children?
8. How do you compare the effect of power outages on your health and the health of family members (please mention the rest according to the respondent's role in the family) father, mother, and child in terms of physicality?

9. How do you compare the effect of power outages on your health (please mention the rest according to the respondent's role in the family), the father, the mother, and the child from a psychological point of view?
10. According to your experience, does the impact of power outages have a greater impact on children than on parents? What about children with disabilities?
11. If the respondent has a child with a disability: What is the nature of the disability? Are any utilities that need electricity used? How is the child dealt with when the power is out?
12. Do your children have health conditions or diseases that are directly or indirectly related to the power outage?
13. Has your home or family been exposed to any fires that were caused by a power outage? If yes, what was the cause? And what was the result?
14. How was the power outage dealt with in the past two years in light of the Covid-19 pandemic? Especially concerning the health conditions of your children and Online education?
15. How do you deal with your children under the conditions of power outages and availability? Do you provide alternatives for them in terms of education and health?