

Creating Map of interactive Services Aiding and Assisting persons with DisAbilities (MSAADA) in Kenya: A Tutorial for the Novel Use of A Store Locator App

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Abstract

Objectives: According to the World Health Organization, an estimated 15% of the population is living with a disability. In Kenya, children with disabilities remain one of the most vulnerable populations, experiencing significant barriers to wellness and inclusion. Our objective is to develop an interactive map of organizations and institutions that provide medical, educational, financial, or social resources to individuals with disabilities in Kenya. The target audience for this tool includes persons with disabilities, caregivers, medical professionals, and organization leaders.

Methodology: A comprehensive list of 219 organizations, government county offices, education assessment and resource centers (EARCs) and institutions was compiled from various online directories. Each organization was contacted for an interview to discuss contact information, address, services offered, payment options, requirement for enrollment, and transport services. Based on the types of services offered, each organization was assigned categorical search tags. The data was entered into a third-party mapping site. The map was inserted into a page on the Academic Model Providing Access to Healthcare (AMPATH) website.

Future Steps: The next phase of the project will be twofold: improve overall quality and provide more detailed information on each organization. To improve accuracy, there is a short survey that allows organizations to provide updates and give feedback. To provide more information on services, information guides are being developed. Long-term, the map may be expanded to include organizations in neighboring countries and formatted to be a smartphone app.

Potential Impact: Using the search features, this tool will allow medical professionals to give more patient-specific referrals and caregivers to access these resources from home. Additionally, this map will inform organizations where resources are limited within the country. Ultimately, this interactive map will serve as a bridge to connect children with disabilities and their families to nearby services.

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Abstract

Background: An estimated 15% of the global population is living with a disability. In Kenya, children with disabilities remain one of the most vulnerable populations, experiencing significant barriers to wellness and inclusion. Smartphone ownership and internet access have been increasing across Sub-Saharan Africa, including Kenya. Despite these advances, online or mobile resources remain limited and difficult to find and navigate.

Objective: This paper aims to describe the novel use of a store locator app to develop an interactive map of organizations that provide medical, educational, and socioeconomic resources to individuals with disabilities in Kenya. The target audience is individuals with disabilities, medical professionals, and organization leaders.

Methods: A comprehensive list of organizations, government county offices, educational assessment and resource centers, and institutions was compiled. Organizations were contacted via email, WhatsApp, or in-person for a semi-structured interview. Based on the services offered, each organization was assigned categorical search tags. The data was entered into a third-party store locator app. The map was inserted into a page on the Academic Model Providing Access to Healthcare (AMPATH) website.

Results: The Map of interactive Services Aiding and Assisting persons with DisAbilities (MSAADA; Swahili for “help”) was launched in July 2020 in both English and Swahili. The map included 89 organizations across Kenya. Of those, 51 were reached for an interview (57% response rate). Interviewees cited limited paid staff and dependence on grant-based funding as primary challenges to growth and sustainability.

Conclusion: MSAADA is an interactive, virtual map that aims to connect individuals with disabilities, medical professionals, and organization leaders to resources in Kenya. The novel use of a store locator app to compile resources in remote settings has the potential to improve access to

healthcare for a wide variety of specialties and patient populations. Innovators in global health should consider the use of store locator apps to connect individuals to resources in regions with limited mapping.

Introduction

Background

According to the World Health Organization, an estimated 15% of the world's population is living with a disability. Globally, individuals with disabilities have worse health outcomes, encounter more barriers to education and employment, and experience increased levels of poverty compared to individuals without disabilities [1]. Children with disabilities are one of the most vulnerable populations. An estimated 11.2% of children and adolescents have a disability, and nearly 95% reside in low- and middle-income countries (LMICs) [2].

Prevalence of disability in Kenya reflects global trends. An estimated 10.3% of Kenyans have some form of disability, including difficulty with seeing, hearing, mobility, cognition, self-care, and/or communication [3]. In 2003, the Government of Kenya passed the Persons with Disabilities Act, prohibiting discrimination against persons with disabilities and improving access to care, education, and employment [4]. Despite these legislative changes, children and adults with disabilities in Kenya continue to experience significant barriers to wellness and inclusion, including barriers to education [5], barriers to employment [6], and poorer health outcomes compared to individuals without disabilities [1].

Individuals with disabilities in Sub-Saharan Africa experience multiple barriers to accessing healthcare and services. These barriers include stigma around disability, lack of awareness about their disability, and inability to access transportation or other poverty-related factors [7]. Few accessible resources exist to directly help individuals with disabilities navigate therapy and equipment needs. Additionally, due to limited availability, few healthcare professionals and skilled providers are knowledgeable about referral and equipment resources for families caring for individuals with disabilities [7-8]. Based on this understanding, we identified a need to compile resources in a centralized place where families could easily access them.

We recognized the growing share of Kenyans with access to smartphones and internet as a potential pathway for connecting Kenyans to resources for individuals with disabilities. Smartphone ownership and internet access have been increasing across Sub-Saharan Africa, including in Kenya [9]. 80% of Kenyans own a mobile phone, and 30% own a smartphone. 39% of Kenyans use the internet, including more than half of Kenyans between ages 18 and 29 [9]. Despite these increases in access to information via the internet, many online resources are difficult to find and navigate.

Objectives

This paper aims to describe the novel use of a store locator app to develop an interactive map of organizations that provide medical, educational, and socioeconomic resources to individuals with disabilities in Kenya. The project is titled MSAADA, an acronym for Map of interactive Services Aiding and Assisting persons with DisAbilities. In Swahili, the word “msaada” translates to the English word “help.” The target audience is individuals with disabilities, medical professionals, and

organization leaders to access needed services.

Methods

Setting: AMPATH in Western Kenya

In 1990, Indiana University School of Medicine began a partnership with Moi Teaching and Referral Hospital, located in Eldoret, Kenya. In 2001, other universities joined to establish a long-term partnership known as the Academic Model Providing Access to Healthcare (AMPATH). The mission of AMPATH is to address the needs of care, training, and research required to improve the health of individuals globally. Within this tripartite mission, care remains most important and central to AMPATH. The model prioritizes bilateral exchange of medical doctors, residents, students, and researchers to serve together in Kenya and North America. Every project based in Kenya must be care-centered, sustainable, and locally led [10].

We are a team of two pediatricians (one from Kenya, one from the U.S.) and two medical students (one from Kenya, one from the U.S.). Much like other initiatives started within AMPATH, this project was formed out of a gap in patient care. Healthcare providers at Moi Teaching and Referral Hospital were having difficulty connecting their patients with disabilities to available resources and services in their communities. The reasons for this were complex. In part, disability is an umbrella term for various conditions, meaning that a resource that supports one family may not be the best fit for another family. Additionally, Moi University Teaching and Referral Hospital is a large referral center, so providers in Eldoret may not be aware of resources for their patients in Kabsabet. In a setting where transport is limited, proximity is crucial. Finally, existing search engines and maps often do not contain updated or detailed information from organizations in Kenya, which remains a major barrier to accessing those resources.

Ultimately, the team decided to make MSAADA available through the AMPATH website for two reasons. First, this academic partnership already has various long-term connections with organizations that could be added to the site. Many of the organizations that were added were mentioned by the pediatric research team based in Kenya, given their experience living and working alongside children with disabilities and their families. Secondly, adding MSAADA to the AMPATH site allows for opportunities for trainees from both Kenyan and U.S. institutions to help update the map over time. A critical component of this resource is that it is regularly updated to be sustainable. Having undergraduate and graduate students actively involved in this project allows for greater consistency overall.

Creating a Database

The first step to developing MSAADA was to create a database of organizations, institutions, and government offices that provided resources for persons with disabilities in Kenya. This step was conducted through various methods. The team started with a list of organizations that were commonly known by the pediatric research team at Moi Teaching and Referral Hospital. Subsequently, the team used common search engines at the start to find other organizations. Upon continued searching, the team was able to find several directories, however many organizations' contact information and services were not updated. In some cases, the organizations in the directory no longer existed. The team compiled a comprehensive list. Organizations with an email address or WhatsApp number were contacted to do a virtual interview to verify basic information and discuss

the services provided by the organization. The information gathered included organization name, address, email, website link, social media links, phone number, primary contact, longitude and latitude, services offered, payment options, requirement for enrollment, and transport services (see Appendix 1). After those interviews were conducted, a team member based in Kenya traveled to Nairobi and to conduct interviews with other organizations in person. All information gathered in these interviews was stored in a shared database for the map.

Selecting Storepoint: A Store Locator App

The next step was selecting a way to feature each of the resources in one map that would be easy to use and manageable to update regularly. Storepoint is a user-friendly, customizable mapping feature that can be incorporated into any website. It is originally purposed as a store locator app, a feature where a business can display each of their locations on a map. This program allows consumers to enter in their city or zip code to find the nearest business location. There are also features on the map that allow consumers to filter locations based on specific qualities. While there is a monthly cost, it is relatively intuitive to use and requires no prior knowledge or expertise in coding. After considering other comparable options, Storepoint was chosen to host MSAADA as it gave the team the greatest opportunity for customization without the burden of having to train students to gain highly technical skills. From a sustainability standpoint, the cost to use Storepoint was allocated in the monthly research budget.

Adding and Editing Organizations

The following steps detail how to add and edit organizations using Storepoint after gaining membership. On the main dashboard, you can select “Add Location” to add one location or “Bulk Import Locations” using a spreadsheet to add multiple locations at once. For MSAADA, every location on Storepoint represented an organization. The organization name, email address, location, social media link (Twitter, Facebook, Instagram), photo, logo, and “tags” (see Adding Search Categories) were filled in on the form to be featured on the map. Location can either be determined by a street address or longitude and latitude coordinates, which provided flexibility and precision when some organizations in this setting did not have a traditional street address. To edit an organization, you can select “Search Locations” to find the organization you want to edit and click on it to update or change any information.

Adding Search Categories

One feature of Storepoint is the ability to categorize organizations by various features that can help the user more easily locate a specific resource. This step involves “tagging” organizations within a “tag group.” This allows users to click a tag group dropdown in the search bar above the map and to filter by a specific tag. For instance, there is a tag group called “Select by Cost” and then tags called “\$”, “Free”, “NHIF”, and “Private Insurance.” Users could potentially click “Select by Cost” and then “Free” if they only want organizations that have free services to be shown on the map. On Storepoint, you can add tags by selecting “Manage Locations” and then selecting “Tags and Filters.” To add a tag group, click “Add A Tag Group” at the top. To add a “tag” to a location, you can add it to the information of a specific location under “tags” (see Adding and Editing Organizations).

Tag groups were created before interviewing organizations and adjusted as interviews progressed to reflect the types of resources offered by each organization. An unlimited number of tags and tag groups can be created and added for each organization. The tag groups and tags included for the initial phase of the map can be found in Appendix 2. The filter can be set up as an “and” or “or” when multiple tags are chosen. We have it set to “and” for MSAADA. For example, a user may select “free” AND “speech and language therapy” AND “cerebral palsy” as tags. In this search, only organizations with all three of these tags would appear, meaning they offer free speech and language therapy for individuals with cerebral palsy. Since the map already has hundreds of organizations featured, this allows individuals to easily search to find specific resources of interest.

Embedding to the Website

This final step discusses how to incorporate a Storepoint map into a website. This step involves going to “Embed Locator” on the Storepoint dashboard. An embed link is provided that can be copied into the website HTML. Any changes through the Storepoint account will automatically be reflected, so the embed code does not need to be adjusted. For our team, this was an added benefit for this project since we were not personally managing the website. AMPATH generously allowed the team to use a URL connected to their domain for MSAADA and helped us to create a functional site for users.

Additional Features

In addition to the interactive map, the webpage provides access to three other valuable resources: Disability Card Infographic, Kenya Disability Resource, and Kenya Disability Directory. The Disability Card Infographic was created by the team to explain and illustrate the process for obtaining a government card issued to individuals with disabilities in Kenya, as shown in Figure 1. This infographic was also translated to Swahili and made accessible on the website.



Figure 1. A downloadable step-by-step guide to obtaining a disability card in Kenya. Created using Canva.

The Kenya Disability Resource is a website dedicated to providing information, creating awareness, and building community around disability in Kenya. The Kenya Disability Directory is a directory created by Handicap International in 2010 that includes hundreds of organizations in a PDF format.

Functionality of MSAADA

Throughout the methods section, the primary format has been a step-by-step tutorial on how to use a store locator app to develop an interactive resource map in a remote setting. Here, we will briefly describe how the target audience could use MSAADA. Any individual with internet access can log onto the map using the URL created by AMPATH to host the webpage (<https://www.ampathkenya.org/disabilityresources>). At the top of the page, users can select “Unazungumza Kiswahili?” which will take them to the same resource map translated to Swahili. If English is preferred, the user can continue to the map.

After scrolling down, users can type in their location by inputting the village, city, or region. The location search bar will auto-populate options to provide additional choices. They can then select the drop-down arrow for how many kilometers they are willing to travel from their selected location with options ranging from 5-100 kilometers. In Figure 2, “Nairobi, Kenya” has been typed in and “25 km” has been selected from the dropdown arrow.

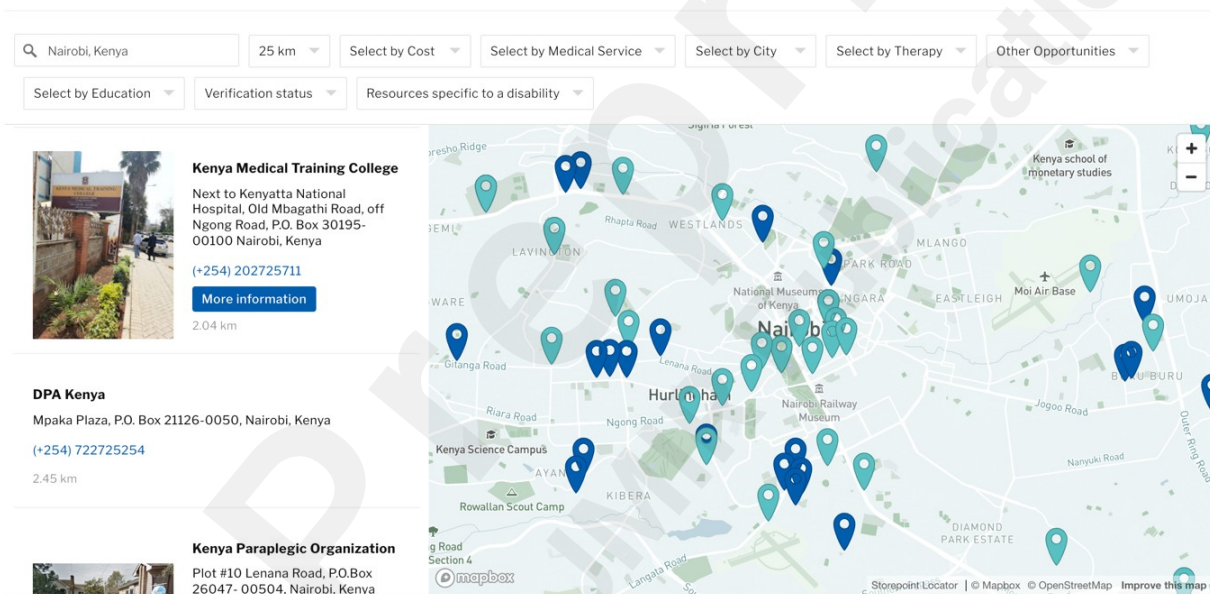


Figure 2. Interactive map showing all resources within 25 km of Nairobi, Kenya as selected in the search bar at the top of the map.

The remaining drop-down arrows allow users to select from various criteria listed earlier as tags. In this case, “verified” under “verification status” and “occupational therapy” under “select by therapy” have been selected, which will show all organizations that provide verified occupational therapy services within 25 kilometers of Nairobi, Kenya. In this search, four organizations are shown, as seen in Figure 3.

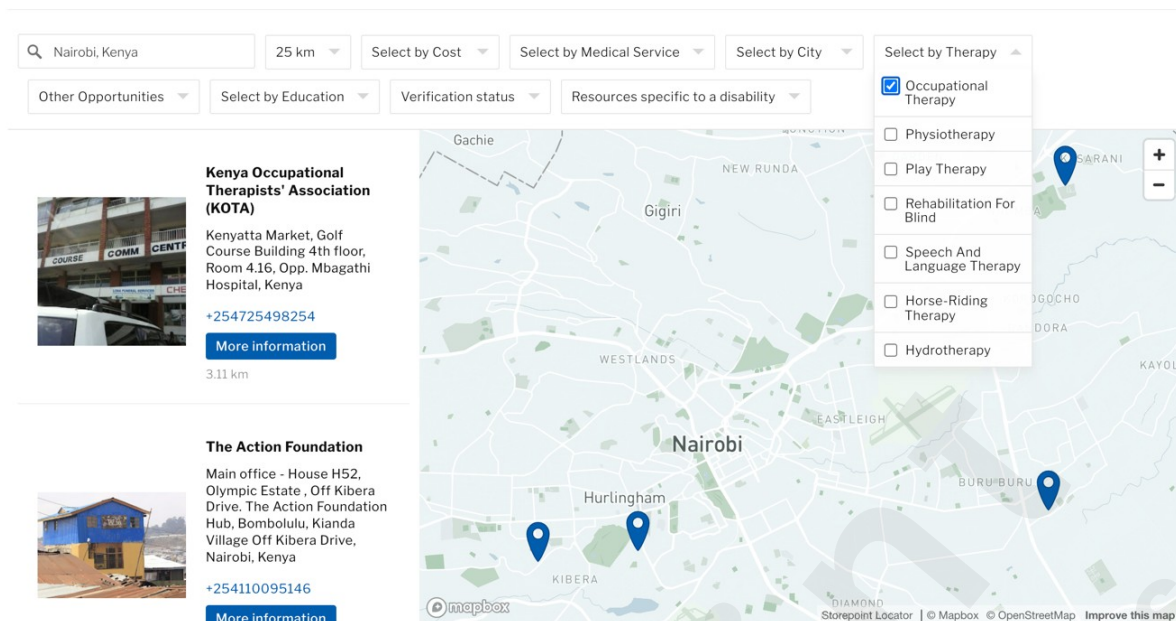


Figure 3. Interactive map showing all resources that are verified and offer occupational therapy services within 25 kilometers of Nairobi.

Results

MSAADA was launched in July 2020 in both English and Swahili. The team compiled a list of 219 organizations and institutions within Kenya that offered services to individuals with disabilities. Of those, 89 organizations had an email address or WhatsApp line that the team was able to send an introductory email to set up an interview. Of the 89 organizations that were contacted, 12 interviews were conducted. An additional 39 were reached in person and completed an interview. In total, 51 interviews were conducted out of 89 organizations, giving a response rate of 57%. In the interviews, the organization representatives mentioned limited staff and volunteers and grant-based (short-term) funding as the primary challenges for growth and sustainability of their services. When asked about features that would be valuable for the site, the majority of organization representatives mentioned the need for it to be accessible for all individuals with disabilities.

Discussion

Advantages

Translated to Multiple Languages

One of the most valuable features of Storepoint is that the map can be translated into multiple languages. Each translation of the map has a unique embed code that can be inserted into a website. The two official languages in Kenya are English and Swahili, however there are over 30 distinct languages and dialect clusters spoken in Kenya. Originally, MSAADA was developed in English and then members of the team in Kenya translated the site features and additional documents on the site

into Swahili. Additionally, since the team originally created MSAADA, the AMPATH website has added an accessibility feature called UserWay, which can be seen as a small widget icon in the lower right-hand portion of the screen. Among many accessibility features that are detailed later, this widget can translate the entire site into 42 additional languages.

New Organization and Feedback Forms

Another key feature of the website is a form for organizations not yet featured on the map to add their organization and provide key information. The site also includes a link to a form for organizations to provide feedback for the map and make updates to the information specific to their organization. Upon submission, both surveys are automatically sent directly to the individual on the team who is consistently updating the map. This feature allows new organizations and already featured organizations to ensure that information on MSAADA is accurate and up to date.

Disadvantages and Limitations

Grant-Based Funding

A major challenge noted by several organizations was that projects and services are highly dependent on grant funding. As a result, a specific service may only be offered for 1-5 years, based on the length of the grant. This presents an obstacle for both healthcare providers and individuals with disabilities because the resources that exist are constantly evolving. The benefit to having an interactive map is that these changes can be quickly made by the team and reflected immediately in MSAADA for its users.

Communication with Organizations

Another challenge for the development of MSAADA was communication with organizations as seen with the low initial response rate. This is likely due to several factors including outdated contact information, limited access to internet, and limited time of staff or volunteers. During the interviews, many organizations noted they have a limited number of employees and are completely operated by volunteers, making it difficult for them to respond or devote time to an interview. This presents a challenge to having information that is verified and accurate. Additionally, most of the communication was initially conducted via email, WhatsApp, and video chatting from the U.S. To further develop relationships with organizations, a member of the team based in Kenya visited 39 organizations in Nairobi, Kenya to meet with employees and volunteers in person. This aided greatly in verifying contact information from several organizations within a short timeframe but may not be feasible to do for every organization across Kenya on an annual basis. However, the team found that through this relationship-based model, we were able to gather updated information that could not be found online elsewhere.

Reliance on Human Endeavor

A final limitation that should be noted for this model is that it relies heavily on human endeavor to update. To develop MSAADA, one research team member input the data collected in virtual and in-person interviews, as well as from the two Google forms. Updating will be done on a weekly basis using the two Google forms and making edits to the Storepoint page. In the future, this may be

automated, but at this time, the human component allows for two major advantages: (1) to build a relationship with the organization and (2) to review and revise any errors before uploading to the public domain. Additionally, we have a sustainable internal system for updating the site. There are always at least 2-4 medical students or graduate students on the research team at any given time. Every semester, a student will be assigned the responsibility of working with Kenyan colleagues and organizations to maintain MSAADA.

Future Improvements

Increased Accessibility and Inclusivity

A crucial component of MSAADA is that it remains an accessible and inclusive resource for all users. Currently, the AMPATH website utilizes UserWay which includes a dictionary, screen reader, different modes of contrast, highlighting, text sizing and spacing options, dyslexia-friendly options, and cursor formatting. These features improve usability for individuals who have visual impairments or difficulty reading written text on a computer screen. Another key feature of accessibility is ensuring that the site remains financially accessible to users across Kenya. As a result, this resource will remain free for users to avoid excluding anyone based on socioeconomic status. Additionally, since internet remains a high expense, a long-term goal is to investigate the possibility of creating a smartphone app of MSAADA that could be downloaded and utilized without internet access. Finally, at this time, the map is limited to organizations and institutions within Kenya. To make it more geographically accessible, the map may be expanded to include locations in neighboring countries in East Africa, such as Uganda and Tanzania.

Information Guides

In the next phase of MSAADA, another goal is to have more detailed information about each resource that is organized for individuals with disabilities, medical professionals, and organization leaders. One proposal is to create clear, easy-to-reference information guides about each organization. For instance, a medical professional may find free speech and language therapy for individuals with cerebral palsy for a patient and be able to provide the contact information, website, and address to the organization. However, if the medical professional could direct the patient to a one-page chart with more detailed information about “when” or “how to qualify” for this program, an information guide could be a valuable extension of the map. These could be created in a standard format, translated to multiple languages, and uploaded as downloadable files to the webpage.

Promotion and Evaluation

Another next step for MSAADA will be to seek feedback in order to evaluate the usability of the interactive map. The team plans to introduce MSAADA to groups of individuals within the target audience. A survey or short interview guide will be developed in order to gain feedback from individuals and to evaluate for improvement. Eventually, the team may plan to utilize the “Locator Analytics” feature on Storepoint which allows users to create a heatmap of popular search areas, develop a chart of locator views and searches over time, and obtain the average distance individuals

are traveling to their destination. By publishing this data in the future, MSAADA will not only benefit those currently using it, but also provide organizations with data on how to better reach individuals with disabilities in the future.

Conclusion

Ultimately, this paper describes the novel use of a store locator app to develop an interactive map of organizations that provide medical, educational, and socioeconomic resources to individuals with disabilities in Kenya. The use of a store locator app to compile resources in remote settings has the potential to improve access to healthcare for a wide variety of specialties and patient populations. Innovators in global health should consider the use of store locator apps to connect individuals to resources in regions with limited mapping.

Acknowledgements

Our team would like to acknowledge and thank Debbie Ungar at AMPATH Kenya for her support and expertise in formatting and developing the website that hosts MSAADA.

Conflicts of Interest

None declared.

Appendix

Multimedia Appendix 1: Interview Guide to Verify Organizations

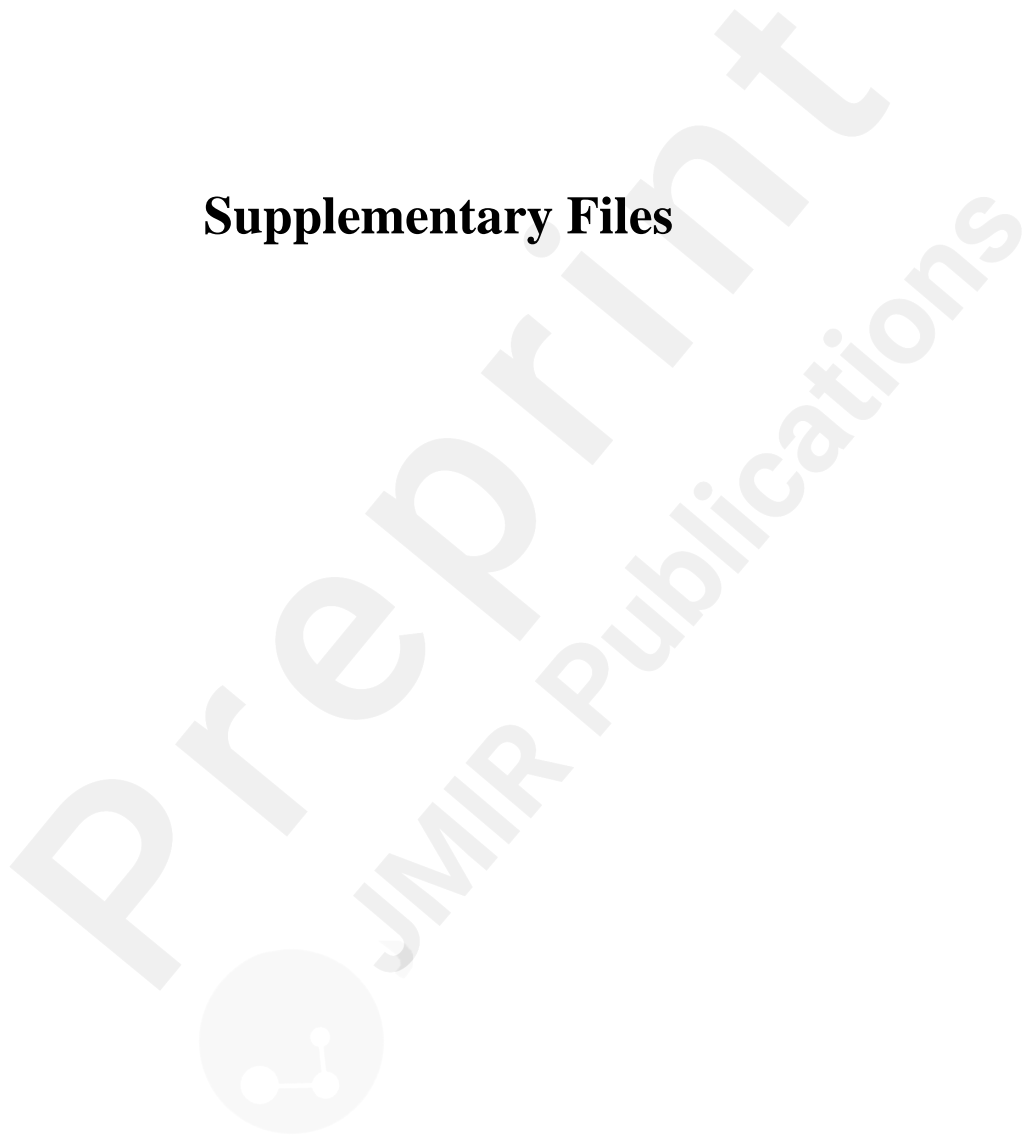
Multimedia Appendix 2: Search Tags for Organizations

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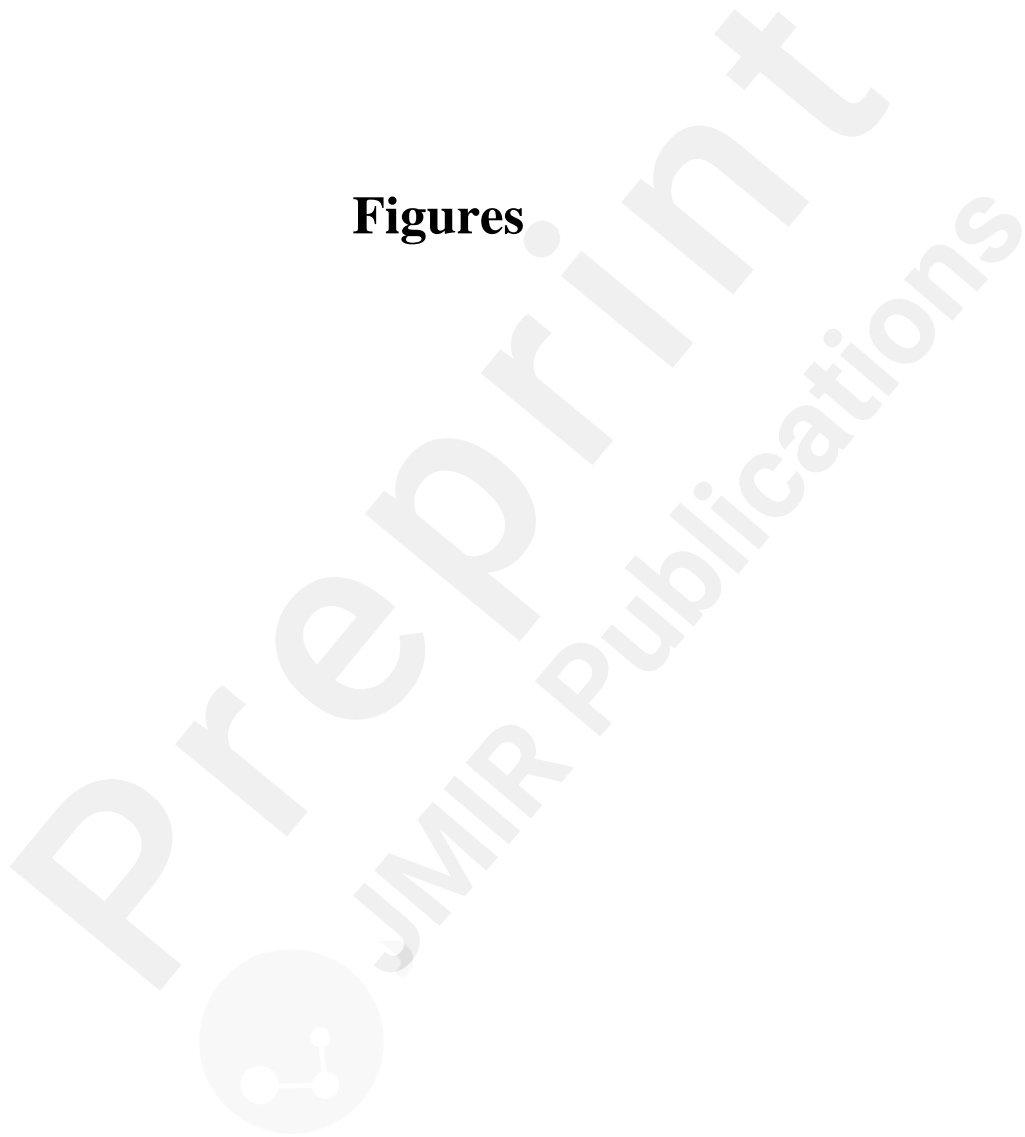
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Supplementary Files




Figures



A downloadable step-by-step guide to obtaining a disability card in Kenya.


Applying for a Disability Card in Kenya



STEP 1: Does your child have a disability?


"A physical, sensory, mental or other impairment, including any visual, hearing, learning or physical incapability, which impacts adversely on social, economic or environmental participation"

Persons with Disability Act of 2003, Act 14




STEP 2: Visit a government hospital gazetted for disability assessment

Assessments are not every day, so call or visit in advance to book your child's appointment. This is free at most hospitals. Bring a passport-size photo of the child.



STEP 3: Take your application to the National Council of Persons With Disabilities (NCPWD) regional office in your county

It will be sent to the Ministry of Health and the National Council of Persons With Disability. Expect to wait a few weeks.



STEP 4: Return to pick up your child's disability card

You will pick it up at the NCPWD regional office where you dropped it off. If you want to be considered to receive financial support, call your office to find out when recruitment will be done.

Source National Council for Persons With Disability <http://ncpwd.go.ke/>

Interactive map showing all resources within 25 km of Nairobi, Kenya as selected in the search bar at the top of the map.

The screenshot displays an interactive map interface for Nairobi, Kenya. At the top, there is a search bar containing "Nairobi, Kenya" and a radius selector set to "25 km". To the right of the search bar are several filter buttons: "Select by Cost", "Select by Medical Service", "Select by City", "Select by Therapy", and "Other Opportunities". Below these are three more filter buttons: "Select by Education", "Verification status", and "Resources specific to a disability".

On the left side, there is a list of three resource cards:

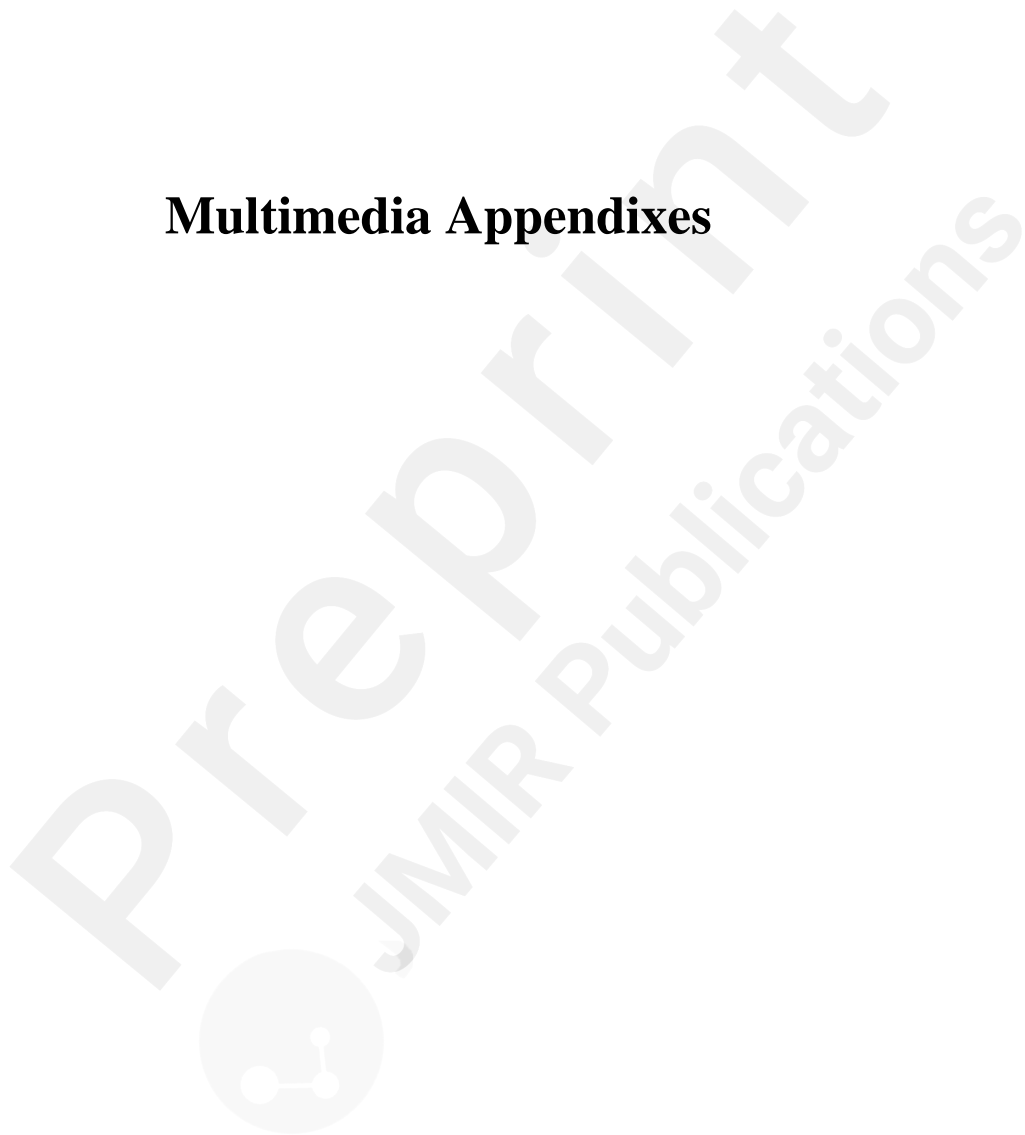
- Kenya Medical Training College**: Next to Kenyatta National Hospital, Old Mbagathi Road, off Ngong Road, P.O. Box 30195-00100 Nairobi, Kenya. Phone: (+254) 202725711. Distance: 2.04 km. Includes a "More Information" button.
- DPA Kenya**: Mpaka Plaza, P.O. Box 21126-0050, Nairobi, Kenya. Phone: (+254) 722725254. Distance: 2.45 km.
- Kenya Paraplegic Organization**: Plot #10 Lenana Road, P.O. Box 26047-00504, Nairobi, Kenya.

The main area of the interface is a map of Nairobi, Kenya, with numerous blue location pins indicating the positions of the resources. The map includes labels for various districts such as Westlands, Hurlingham, and Eastleigh, as well as landmarks like the Nairobi Museum and Kenyatta International Airport. A large, semi-transparent watermark reading "Preprint JMIR Publications" is overlaid diagonally across the map.

Interactive map showing all resources that are verified and offer occupational therapy services within 25 km of Nairobi.

The screenshot displays a web-based interactive map interface. At the top, there is a search bar with 'Nairobi, Kenya' entered and a radius dropdown set to '25 km'. Several filter buttons are visible: 'Select by Cost', 'Select by Medical Service', 'Select by City', 'Select by Education', 'Verification status', and 'Resources specific to a disability'. A 'Select by Therapy' dropdown menu is open, showing options: 'Occupational Therapy' (checked), 'Physiotherapy', 'Play Therapy', 'Rehabilitation For Blind', 'Speech And Language Therapy', 'Horse-Riding Therapy', and 'Hydrotherapy'. Below the filters, two resource cards are shown. The first card is for 'Kenya Occupational Therapists' Association (KOTA)', located at Kempatta Market, Goff Course Building, 4th floor, Room 4.16, Opp. Mbagathi Hospital, Kenya, with a phone number +254725498254 and a distance of 3.21 km. The second card is for 'The Action Foundation', located at House H52, Olympic Estate, Off Kibera Drive, The Action Foundation Hub, Bombofufu, Kianda Village Off Kibera Drive, Nairobi, Kenya, with a phone number +254110095146 and a distance of 4.99 km. The map itself shows Nairobi and surrounding areas like Gachia, Gijiri, NEW BUNDA, WESTLANDS, Hurlingham, KIBERA, KAYELE, and BURUBURU. Blue location pins are placed on the map. A large 'Preprint JMIR Publications' watermark is overlaid diagonally across the map.

Multimedia Appendixes



Interview Guide to Verify Organizations.

URL: <http://asset.jmir.pub/assets/4084edbf9d1d3eb3fdca8c157115a7e8.docx>

Search Tags for Organizations.

URL: <http://asset.jmir.pub/assets/99c5232cef0a9b882c2b75ef1638b599.docx>

