Telemedicine: Current Obstacles in Telemedicine system Implementation in Rural Areas in Pakistan

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Abstract   Telemedicine is well-positioned in low and middle-income countries (LMICs) to revolutionize wellbeing care due, in portion to expending portable phone get to and web network. This paper assesses the basic components that can potentially facilitate or ruin the advanced wellbeing in Pakistan. The objective of this thing is to recognize the current computerized wellbeing ventures and considers being carried out in Pakistan, as well as the key partners included in these activities. We conclude that whereas telemedicine features a promising future in Pakistan, it is still in its earliest stage at the time of this study. In any case, due to the COVID-19 widespread, there's an increment in requests for digital health and execution of health outcome taking after worldwide social removing conventions, particularly in LMICs. And extend the digital health segment for the improvement of telemedicine frameworks in our country.

Key Words: Digital Health, Telemedicine, M-Health, SWOT, E-health

Introduction

The world health organization addresses telemedicine as a worldwide procedure in 2020-2024, and its telemedicine health policy draft characterizes advanced wellbeing as "the field of information and practice related with the improvement and utilization of telemedicine to move forward health" [1]. It may be a wide umbrella term encompassing portable wellbeing e-health, telemedicine, and progressed computing science like genomics, artificial intelligence (AI), and big information [2]. Computerized wellbeing could be a rapidly growing industry that, agreeing to a few gauges, is expected to be esteemed at U$504.4 billion by the conclusion of 2025 [3]. It is being seen as an available and reasonable arrangement for people who don't have to get to the conventional wellbeing framework and an important apparatus in accomplishing maintainable advancement objectives [4]. Digital technologies like manufactured insights (AI) and machine learning (ML) are a fundamental portion of numerous businesses and companies within the created world. They are a driving constrain in

multimillion-dollar businesses, such as automotive manufacturers, who depend on AI to, for illustration, foresee when cars might require repair to guarantee the security of travelers [5]; the keeping money segment, where AI is connected to distinguish fraudulent transactions [6]; and silicon valley monsters like Google, Facebook, and others, who have shaped a consortium for conducting investigate aiming to make strides the understanding of AI innovations for the made strides welfare of society [7].

The health division is additionally grasping the digital transformation; telemedicine innovation in created nations is being utilized in major angles of the wellbeing care prepare, counting consultation, diagnosis, treatment, observing, understanding instruction, behavioral modification, and medicine adherence [8-11]. In the fast-growing field of well-being AI, a later consider in japan utilized an AI-based symptomatic framework that illustrated a higher diagnostic precision for esophageal carcinoma than those from conventional strategies [12].

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Within the united states, over 61% of wellbeing care educate give telemedicine services, which are secured by protection approaches and Medicare program [13,14]. Agreeing to gauges, telemedicine services helped the US office of veteran's undertakings diminish its hospitalization for mental wellbeing infections by 40% in 2012 [15].

In Pakistan, the doctor-to-patient proportion is near to 0.83 physicians per 1000 people within the population. Digital health interventions are being planned to address different wellbeing care needs. A few SMS-based intercessions are being utilized to improve medicine compliance in patients with NCDs, and telemedicine devices are being utilized to teach patients and to keep wellbeing care experts side by side of medical advancements. Additionally, as numerous female specialists leave clinical hone due to family and childcare responsibilities, telemedicine activities such as e-doctor (SE software technologies) and sehat Kahani (grocode.io) empower them to conduct their therapeutic hones remotely by means of online patient consultation through telehealth stages.

In this paper the authors define the term telemedicine as the delivery of medical care provision of general health services from distance or virtually. Telemedicine has been present here for decades and has proven itself a successful and potential resource to patients, hospitals and physicians. The COVID-19 pandemic has resulted in strong increase of telehealth in healthcare services. This paper focuses on components of telemedicine like patients, Doctors, Technology, that how they respond in current situation as, can technology support all areas in the US? and can patients and physicians be able to fully use the telehealth system? and concepts related to this.

The ongoing war against COVID-19 in the U.S. is still progressing and is expected to remain at the top of the plan for healthcare systems in the coming months. However, telemedicine has already emerged to be an important platform, not only to divert an increasing number of patients from emergency rooms to online, but also to change the work practices of thousands of providers across various specialties. New practices, problems, solutions, and policies will be there as, telemedicine will grow in the next coming time.

In response to COVID-19 pandemic, the use of telemedicine is heavily expanded and it is also a concern to healthcare systems to adapt telemedicine rapidly with new complexities as there will be problems regarding the implementation of this system equitably. As this virtual healthcare system will risk spreading disparities among sidelined inhabitants or communities which are already having worse health outcomes and limited access to necessary health or other resources for effective use of telemedicine.

Literature Review

Virendra Sinha (2012) Eye Opening Aspect of Telemedicine in Punjab has examined the various specialized issues, their disadvantages in India. A set of benchmarks have to be implemented. They have talked about telemedicine in terms of neuron surgical crises and suggest the standards to be always refined for effective usage of this developing technology.

Mishra (2008) have highlighted the display state of telemedicine in India. In his consider design and execution of telemedicine organize in a sub-Himalayan state of India that there are parts of endeavors started by the private and the open segment in arrange to make strides the quality of medical administrations. Digital medical libraries have to been presented.

Moghadas (2008) An Improved Three Pattern Huffman Compression Algorithm for Medical Images in Telemedicine characterized a telemedicine wellbeing care framework which can be used for observing the persistent in a crisis circumstance. The proposed telemedicine system consisted of a portable/non convenient telemedicine area and a portable/non versatile base section. The utilize of TCP/IP makes the operability of frameworks area in a telemedicine environment more efficient.

Yang Xiao (2007) in his paper Wireless telemedicine and m-health: Technologies, applications, and research issues clarify the utilization and future possibilities of telemedicine technology with illustrations. A brief dialog almost LINCOS venture was moreover displayed. A detailed discourse on different specialized issues like compression, counterfeit insights were presented. Therapeutics sensors, domestic observing frameworks, electrical medical records EMRs which were considered a long-standing time of telemedicine frameworks was too briefed upon.

Amrita Pal (2005) Telemedicine Diffusion in a Developing Country: presented detailed study on the current state of telemedicine in a creating like India. Owing to the larger part 75% of the Indian population living in rustic zones, the creators examine the need for telemedicine in India and have too displayed a case think about on three scenarios and discussed a few of the pivotal components for telemedicine to be effectively actualized still further.

Objective of the Study

The objective of this consider to distinguish the current digital health ventures and ponders being carried out in Pakistan, as well as the key partners included in these activities. telemedicine is a must go thing which is there for the delivery of emergency medical care to patients, but the degree of its use by the US emergency departments is not known with facts and figures. The main objective of the authors was to depict the prevalence of telemedicine use among all US emergency departments. We point to take after a mixed-methods technique and to assess these projects and considers through a strength, weaknesses, opportunities, and threats (SWOT) investigation to recognize the inner and external components that can possibly encourage or prevent the advance of advanced wellbeing in Pakistan.

- To know what a Telemedicine system means
- To Identity the current obstacles in the Telemedicine system in Healthcare Sector.
- To find out the perception of Health Professionals and patients towards the telemedicine system.
- To Study the Future work of Telemedicine system.

Method

The most objective of this consideration is to explore the major digital e-health intercessions in Pakistan aimed at the final 5 years. The target population incorporates people or groups who have used technology-based mediations within the field of digital health. The authors on 18 April 2020 gathered some historical data of colonization on Pakistan rural areas and the diseases which are infectious and related to

COVID-19 pandemic. They comment on the need to expand telehealth to rural Pakistan.

This home telemedicine unit is capable of videoconferencing, medical data gaining, sharing of collected data with physicians, and web-based access to clinical data. Data are transmitted through the existing telephone lines of each household, meaning no extra technological installment was needed. A study revealed that there is 683% increase in the use of telemedicine in COVID-19 during March and April 2020.

Process of Telemedicine

The telemedicine process can be categorized into some ways i.e. technology involved and application adopted.

(a) Technology involved or Real-Time: real-time telemedicine might be as straightforward as a telephone call or as complex as tele therapeutic video conference and tele mechanical surgery. It requires the nearness of both parties at the same time and a telecommunication link between them that permits a real-time interaction to require put video-conference gear is one of the most common shapes of the innovation utilized in synchronous telemedicine.

(b) Store-and-forward telemedicine or Asynchronous: it includes securing medical data (like medical history, pictures) and after that transmitting this information to a doctor or medical at a convenient time afterward for appraisal offline. It does not require the nearness of both parties at the same time. For examples are tele pathology, tele radiology, and tele dermatology.
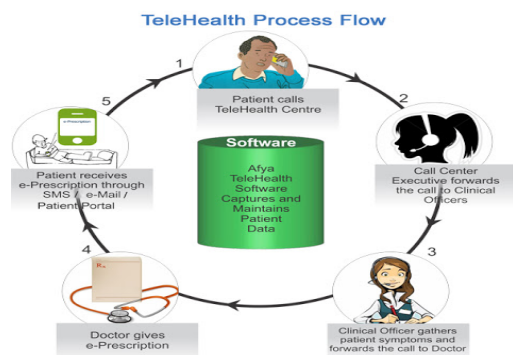
Research design: this think is conducted through blended strategies.The data were accumulated taking after the conceptual system of Arksey and Mallor. Categorized concurring to the WHO's recommended building squares for health system inquire about and analyzed utilizing the SWOT investigation procedure.

Figure 1 depicts the stream of the consider and the major components of the ponder strategy. The ponder was divided into two 3 stages: stage 1 was related to a writing look to identify important creators, paper, and intercessions; stage 2 was related to survey improvement, guiding, the data collection employing a mixed-method approach; stage 3 involved the SWOT examination of the collected information.
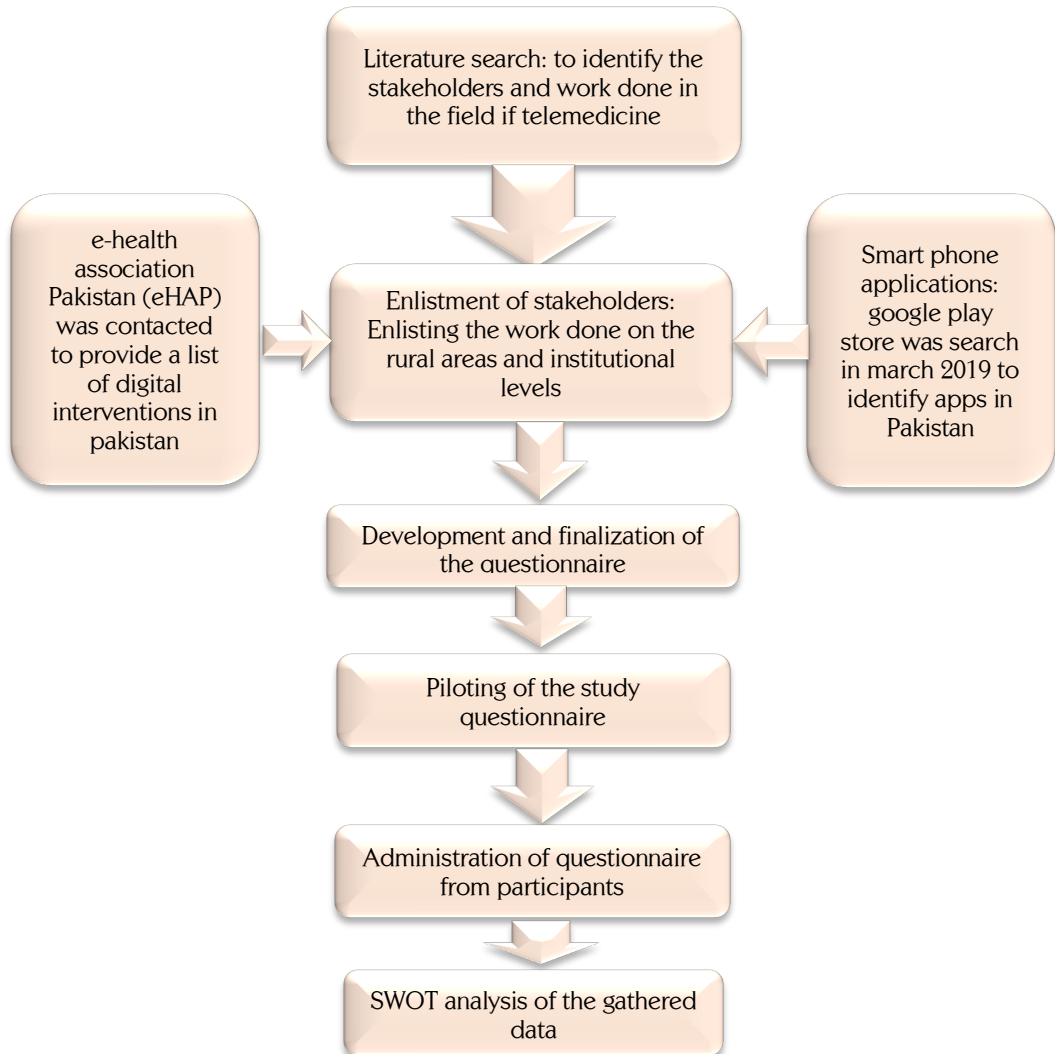
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│ Literature search: to identify  │
│ the stakeholders and work done  │
│ in the field if telemedicine    │
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│ e-health         │   │ Enlistment of           │   │ Smart phone      │
│ association      │   │ stakeholders:           │   │ applications:    │
│ Pakistan (eHAP)  │→  │ Enlisting the work done │ ← │ google play      │
│ was contacted    │   │ on the rural areas and  │   │ store was search │
│ to provide a list│   │ institutional levels    │   │ in march 2019 to │
│ of digital       │   │                         │   │ identify apps in │
│ interventions in │   │                         │   │ Pakistan         │
│ pakistan         │   │                         │   │                  │
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┌─────────────────────────────────┐
│ Development and finalization of  │
│ the questionnaire                │
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│ Piloting of the study           │
│ questionnaire                   │
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│ Administration of questionnaire  │
│ from participants                │
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│ SWOT analysis of the gathered   │
│ data                            │
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Figure 1: Study Flow and Major Components of the Study Methodology.

Results

Basic data of the quantitative study is shared in Table 1. Most of the 51 respondents were open segment (17/51, 34%) and private segment (17/51,34%) representatives working in health care organizations, taken after by the scholarly community (9/51,17%) and nongovernment organizations (1/51,2%). Of the 51 plan, 57% (29/51) begin after 2016, 33% (17/51) begin

between 2011 and 2015, and 6% (3/51) begin between 2006 and 2010. With respect to subsidizing, 37% (19/51) of interventions were supported inside, taken after by 29% (15/51) funded globally and 16% (8/51) supported broadly. Of the applications outlined, 56% (28/51) were near-source and 14% (7/51) were open source.

Table 1. Basic information of the e-health studies and plan in Pakistan (N=51).

Variable	N (%)
Age (years):	
20-30	5(10)
31-40	31(61)
41-50	10(20)
>50	5(9)
Gender:	
Male	41(80)
Female	10(20)
Field of specialist (n=47)	
Information technology	22(47)
Engineering	6(13)
Public health	6(13)
Telemedicine	9(19)
Others	4(9)
Department (n=44)	
Computer science and information technology	11(25)
Pediatrics	9(21)
Primary and secondary health care department	8(18)
Engineering	8(18)
Other	8(18)
Province/territory where the project is being conducted	
Sindh	32(65)
Panjab	9(18)
Federal capital	5(10)
Gilgit Baltistan	2(4)
KPK	1(2)
Not answered	2(4)
Developer of Application (n=43)	
University	16(37)
Private institute	12(28)
Semi-government institute	8(19)
Individual developer	7(16)
How do you explain work on technology in health? (n=43)	
Telemedicine	19(44)
Technology in health	16(37)
General health	5(12)
Geospatial	2(5)
Device development	1(2)
Did you report the study/plan dissemination? Select all that apply (n=31).	
Publications	12(39)
Websites/blog	11(35)
Government and funding agency	5(16)
Not yet	3(10)

Of the mediations, 45% (23/51) were centered around research, 29% (15/51) on execution, 12% (6/51) on application or program advancement, 4% (2/51) each on prototyping or

gadget advancement, and 2% (2/51) each for commercial ventures and framework improvement. Center teams consisted of experts from diverse background; information innovation (IT) experts comprised 40% (21/51) of the center group, taken after by examiners (5/51,10%), epidemiologists (5/51, 10%), understudies (4/51,7%), electrical engineers (2/51, 4%), biomedical engineers (2/51,4%), clinicians (2/51,4%), and cell phone providers (1/51,2%).

The wellbeing spaces focused on by the intercessions included general wellbeing (23/51,46%), immunization (13/51,26%), diagnostics (5/51,10%), and mental wellbeing and behavioral change (3/51,6%). The illness results focused on were NCDs in 56% (29/51) of the mediations, irresistible maladies in 33% (17/51) of the intercessions catered to the common population, 30% (15/51) were particularly for children and teen ages, and 20% (10/51) focused on grown-up as it's were. The focused on population belonged to all the different financial classes, with 39% (20/51) belonging to the center lesson, 38% (19/51) to lower socioeconomic course, and 23% (12/51) to upper socioeconomic class, per the participants' self-rating.

These ventures are too utilizing inventive thoughts for their implementation: 30% (15/51) of the respondents detailed using a modern method or strategy, 17% (9/51) executed the technology in a novel way, and 15% (8/51) utilized a centralized system; 9% (5/51) of the intercessions were low-cost and mobile app-based and another 9% (5/51) were based in inaccessible areas with imperative settings. Smartphone and gadgets were the foremost commonly used component of advanced wellbeing, utilized in 25% (13/51), telemedicine was utilized in 9% (5/51), uncommon gadgets like e-stethoscopes and e-ultrasounds were utilized in 9% (5/51) of the projects, and 3% (2/51) utilized include portable phones and functional phones. When inquired almost obstructions experienced in study execution, 21% (11/51) detailed that the population could not utilize the innovation or versatile phones. Fetched was the second most common boundary, detailed by 16% (8/51) of the responders, taken after privacy concerns, which were raised by 12% (6/51) of the responders.

At the time of the ponder, 37% (19/51) of the ventures were fully operational, 26% (13/51) were completed, and 15% (8/51) were in the method of being scaled up. In respect to the development stage of the innovations, 44% (22/51) of the innovations used in the intercessions were completely propelled, 34% (17/51) were in the pilot phase, 16% (8/51) were within the conceptual organize, and only 3% (2/51) of the innovations utilized were regularized. Major boundaries confronted in actualizing the project-specific technology were the taken a toll on innovation for 28% (14/51) of the projects.

Future work

The primary thinks conducted in Pakistan looks at telemedicine at a national level utilizing SWOT analysis, and that analyzes the innovation and moral dimensions of advanced health. Within the baseline survey, both subjective and quantitative information was collected employing a strategy; therefore, SWOT analysis was the foremost reasonable methodology to analyze the information and highlight the effect of diverse telemedicine activities in Pakistan, because it permitted for the identification of inside components as well as outside variables that impact the implementation of these initiatives.

In general, advanced wellbeing or the utilize of innovation in all domains of wellbeing is a rising calculate universally, and particularly in resource-constrained settings; it can be a capable arrangement for improving wellbeing results locally and at the gross-root levels. This considers and SWOT examination was conducted fair sometime recently the global COVID-19 widespread. In case, the discoveries obtained resonate with the request and advancement in computerized health interventions and developments in line with the wellbeing system. Since the COVID-19 widespread, the part of and request and advancement in telemedicine interventions and developments in line with the wellbeing system. Since the COVID-19 widespread, the part of and request for digital wellbeing has expended altogether, and in a few scenarios, it is the as it were practical arrangement for moving forward whereas following a social separating methodology. In Pakistan, the utilize of advanced telemedicine in dealing with the COVID-19 widespread has surged, especially within the open division; 3 striking intercessions being implemented incorporate: (1) real-time registries and dashboards, (2) a COVID-19 specific telemedicine entrance where patients can

consult a specialist online, (3) an SMS content messaging-based EHSAAS crisis cash exchange program giving financial support to citizens distinguished by the government's poverty criteria amid the implemented COVID-19 lockdown. Due to assist limitations, the current foundation of Pakistan still battles with giving get to high-speed web and smartphones to two-thirds of its population.

A report by Mordor Intelligence predicts that global telemedicine will be worth more than $66 billion by the end of the year 2021. Here's how five telemedicine trends will shape the future of the healthcare industry.

Conclusion

Telemedicine based intercessions are, gradually but relentlessly, being ushered into the existing wellbeing framework of Pakistan. There are still critical obstacles, boundaries, and barricades within the shape of limited web offices, phone proprietorship, organize coverage, unavailability of administrative systems, information assurance and security direction, openness, reasonableness, and paper-based health records, constraining the sorts of advances that can be utilized for viable intercessions. Be that as it may, in spite of all the challenges, computerized wellbeing is consistently extending through the efforts of numerous partners in both the open and private sectors. It is troublesome to say how compelling these interventions have been, as not all mediations are being evaluated or published. The long-run for advanced wellbeing does see bright, especially after the government's unused activity to digitalize the public segment in Pakistan.

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