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Digital and Assistive Technologies for Autism Intervention in Pakistan: Opportunities and Challenges

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ABSTRACT
ASD is a life-long policy neurodevelopmental disorder, which is a worldwide challenge to the general population. The care of ASD in Pakistan is already an uphill struggle complicated by an intersection of socio-cultural, economic, and systemic factors such as the presence of pervasive stigma, delayed diagnosis, and the critical lack of specialized resources in the country. This report assumes that digital and assistive technology provides a paradigm shifting opportunity to bypass these conventional barriers and deploy effective, scalable, and cost-effective, interventions that are required to be geographically accessible. The analysis is a systematic assessment of whether a particular technology, including Augmentative and Alternative Communication (AAC) applications, telehealth solutions, and virtual reality (VR), has the chance to resolve distinguished gaps in communication, diagnosis, and therapeutic endorsement. At the same time, it reviews critically the great barriers to their adoption and implementation such as a marked digital divide, a high economic restraint placed on families, a shortage of professional training and a unified policy. The report ends with a multi-stakeholder roadmap, because the effective incorporation of technology is not a silver bullet, but rather depends on a collective and policy-led initiative to overcome fundamental barriers on the level of infrastructures, economy and socio-cultural practices.

Keywords: *Autism Spectrum Disorder, Assistive Technology, Telehealth, Pakistan, Digital Divide, Public Health.*

Introduction

Autism Spectrum Disorder (ASD) is a multifaceted neuro-developmental disorder characterized by chronic challenges with social relationships, communication, as well as the existence of limited and repetitive behaviors. According to the estimates provided by the World Health Organization, the overall rates of ASD across the globe can be estimated at 1:160 children, which demonstrates its worldwide scale and universal problematic nature when managing it (Saifuddin et al., 2025). Although some people with ASD can lead fairly normal lives, most of them need constant specialist care, and experience considerable learning difficulties (Transformation International Wellness Clinics, 2025). Access to quality diagnostic and evidence-informed intervention methods can be inequitable throughout the world, with costly healthcare services

provided in wealthy nations, and large populations in low- and middle-income environments underserved (Kakooza-Mwesige et al., 2022). Access to resources, lack of skilled workers, and cost are the three typical obstacles that hamper the effective treatment and management of people with ASD and their families across the globe. In Pakistan, there is a complicated interaction of socio-cultural, economic and institutional factors contributing to the exacerbation of the issue of ASD. Although there is no consolidated national data on the prevalence of ASD, the available localized studies imply a similar rate to that found in the global outlook on the issue. As an example, in Karachi it was estimated by 1.3 per cent in 2017 and 1.45 per cent in school-age children in Lahore in 2019 (Saifuddin et al., 2025). A more generous estimate can be seen with the Pakistan Autism Society who claims that there are currently more than 350,000 children with ASD in the nation (Transformation International Wellness Clinics, 2025). Regardless of these statistics, it is one of the most poorly understood neurodevelopmental disorders in Pakistan, which results in a high untreated/improperly diagnosed number of patients (Furrukh & Anjum, 2020).

The obstacles are profound on the social and institutional levels. Essentially, there are cultural stigmas that create very harmful misimpressions such as the assumption that autism is caused by bad parenting or that children who have it are unable to learn or are violent (Special Education Department, 2024). The described stereotypes also result in the social marginalization of autistic children and their families that results in the development of their mental health problems and meaningful academic retardation. The institutional environment is also not integrated. The formal means of support has been mostly through the category of the non-governmental organization (NGO) and the privately operated agencies in the large cities of Karachi, Lahore, and Islamabad. Although these services are worthwhile, in many cases, they cannot afford them and have to allocate a large part of their income to individual counseling and much-needed educational programs (Hasselbring, 2000). The work of the government is minimal; although policies aimed at people with disabilities exist, the concept of disability is not fully implemented in relation to autism, and there are no state-run facilities devoted to their treatment (Castro, 2024). Digital and assistive technologies, in this challenging environment, is one possible new paradigm of intervention. The tools are an exciting potential response to the underlying structural deficit that has hampered progress in autism-care. Technology has the potential to eliminate geographical barriers, make its services cheaper, and more engaging and person-centered through relatively cheap devices (i.e., mobile phones and tablets) with high penetration. Augmented and alternative communication (AAC) apps, telehealth, virtual reality (VR), and social robotics can enhance social skills, communication, and advances that are essential areas of support to caregivers in their home settings. Such solutions provide an opportunity going forward to implement interventions within a low resource environment in a region with a severe supply of trained and qualified clinicians (Bashir & Khanum, 2024).

Scope, Rationale and Methodology

The aim of the report is to give an overall assessment and examination of the role of digital and assistive technologies in autism intervention in Pakistan. It is a combination of disjointed data, intended to give a more comprehensive approach to the opportunities that these technologies raise, as well as daunting challenges that will have to be addressed in order to implement them effectively. The overarching report goal is to deliver an evidence-based stepping stone to a sustainable path forward grounded in an analytical, but not reductionist, approach. The report

presents a qualitative synthesis of the entire panorama of secondary sources, black literature, peer-reviewed journals, official state and non-governmental reports, reports of authorized international organizations. Substantive collection of the research material was done through google scholar among other databases. The methodology chosen was a thematic analysis of this secondary data, which were framed in the form of answering to the opportunities and challenges observed in Pakistani context. The strategy permits the triangulation of findings of various sources, which provides a seamless narrative to connect the underlying issues with the possible solutions and their barriers. Synthesis process entailed the discovery of causes and interdependent relationships between variables that seem not related with one another to foster a multi-dimensional insight on the topic.

The Multidimensional Analysis of the State of Autism Care in Pakistan

The critical absence of consolidated and countrywide information about the prevalence of autism is one of the central obstacles to the enhancement of its management in Pakistan (Saeed et al., 2021). Lack of thorough public health documentation on ASD limits the creation of evidence-based policy decisions and allocation of governmental money to its particular area. This becomes a self-fulfilling vicious cycle: the negligence is based on the lack of good data to measure the extent of the issue so, there is no governmental push or policy to allocate resources to invest in professional training and infrastructure. As a result, autism is not normally held as a prominent priority on the public health agenda. This institutional non-specificity leads to a very considerable diagnosis latency. Often pediatricians and general practitioners do not have sufficient experience to be able to recognize the initial symptoms of autism, which is why it is not timely diagnosed or not diagnosed at all. Also, focused diagnostic services are significantly unequally distributed judging by the fact that such facilities are concentrated in large cities (Mahmood et al., 2022). This geographical difference implies that although families in Karachi, Lahore, and Islamabad can receive some services, in the rural parts, it is common to find undiagnosed autism. What this creates is a system in which ASD is not counted, managed and is also largely invisible creating a cycle of no intervention and adverse outcomes. Worsening the situation, the diagnosis of autism in Pakistan is a rather complicated procedure, which is fraught with cultural and socioeconomic problems (Hasselbring, 2000).

Social-cultural Factors and Stigma

In addition to the institutional chasms, the culture stigmas create a deep and in many cases, an unsurmountable obstacle to curing. The general lack of awareness and knowledge about autism results in the harmful stereotypes that become part and parcel of Pakistani society (Special Education Department, 2024). These myths do not only form a social inconvenience, they directly affect help-seeking behavior. It is a widespread misconception that autism is the consequence of poor parenting and a family with an autistic child can experience a judgment and ostracization within their community and even closer relatives (Khalil, et al., 2024). It is incredibly hard on families, and one mother talked about feeling afraid to attend family get-togethers due to them not understanding her child and thinking that she is a bad mother. This outlines a major psychological burden that has to be solved during any intervention plan.

There is also the direct effect of societal stigma in education. The parents might not want their children to go to school due to the fear of being stigmatised (Sankardas, 2017). In certain instances, the autistic children are denied enrolment in these special schools due to protestation on the part of officials that they are not prepared to deal with their problematic behaviors

(Sankardas, 2017). No, this reluctance is not a personal choice, it is a rational attitude to a society, which did not normalize the condition yet. An important conclusion is the fact that Asian mothers of children with ASD often do not know the word autism before their child receives a diagnosis of ASD (Khalil, et al., 2024). Such low levels of basic awareness at the pre-diagnosis phase highlight the need to carry out larger-scale educational initiatives that have the potential to make it even more recognizable and acceptable. Until a family is placed in a position where it is able to at least recognize the condition, the technological intervention cannot do much.

Institutional and Policy gaps

Formal assistive mechanisms targeting people with ASD in Pakistan are highly underdeveloped and they mostly focus on the private and NGO sectors. Albeit the Autism Resource Center Pakistan (ARCP) and ACRO are among the best-known organizations that do excellent work in spreading awareness, offering assistance, and conducting training, their services are distributed unevenly, including to the urban areas. This produces an unequal system where wealthy families can afford to have therapies privately and poor families fail to have any service at all. Some attempts have been made to include persons with disabilities in Pakistan, where the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) was ratified in 2011 and the first edition of the National Policy on Persons with Disabilities was adopted in 2002 (Iabangi, 2011). With the vision of inclusion in the mainstream and supportive implementation by the year 2025, these policies have a background legal framework of rights of the persons with disabilities (Iabangi, 2011). Nevertheless, there is also a gap between policy and its implementation which is critical. The study shows that even though there are policies in place, their enforcement is questionable since there is a lack of willingness and funding (Mahdi et al., 2022). Negative issues: National autism policy does not exist / A specific government organization that and government policy concerning the area of autism care is a major obstacle preventing the formulation of a unified, national strategy.

Caregiver and Family Burden

The cost of a child with ASD cannot be underestimated when considering the families especially mothers who are mostly in the frontline to shoulder the burden (Furrukh & Anjum, 2020). The mental and the economic burden is enormous. The parents often complain of increased stress levels, mental health issues, and low-quality living standards (Khalil, et al., 2024). To a certain extent, there are some situations when mothers are forced to cut the number of their working hours or quit their job to look after their children, which contributes even more to the economic burden. Families can also be seen as a strong resource despite these large difficulties. It has been observed that parent mediated interventions can achieve a lot of success. Another study conducted in Pakistan indicated that behavior therapy of mothers was very effective in enhancing the level of communication of their autistic children (Ijaz et al., 2021). This fact is especially important in a low-resource environment, where the caregivers and parents will become important change agents. The promise of effective parent delivery of effective interventions repays parents trained to deliver programs in a critical location to expand where professional services are in short supply. This gives a strong reason as to why technology should be used to provide and disseminate parent training programs.

Opportunities: Transformational Possibility of Digital and Assistive Technologies

People can change these fundamental communication and social problems with individuals with ASD with the help of digital and assistive technologies that serve as transformative tools. One

pillar in this technological opportunity involves the Augmentative and Alternative Communication (AAC) systems. The systems vary, and include low-tech tools such as Picture Exchange Communication Systems (PECS) and high-tech speech-generating devices and smartphone apps. They also allow non-verbal people to form visual sentences to communicate the needs and thoughts and complicated ideas, which results in successful changes in communicating and interacting with others.

There are multiple digital tools to assist social learning in addition to direct communication. Such applications as the ones called "Stories2Learn" can be used to create personalized social stories and visual schedules in order to learn how to react on social cues and rules, including taking turns and non-verbal communication. These tools are effective because they offer a secure, predictable, and exciting environment in which a person can train and learn to implement social skills without feeling the pressures of real life interactions (Leung et al., 2021). One of the reasons why such applications can be very successful is that they must be culturally relevant, as mobile learning applications specifically adapted to the cultural circumstances of the Pakistani children were demonstrated to be beneficial in developing their social-emotional abilities (Ahmad, 2015). This implies that a user-based design system, which encompasses local requirements and situations is imperative in enhancing the effectiveness of such technologies.

The Increasing Access of Care Using Telehealth

Telehealth, i.e., the provision of health care services remotely with the aid of technology, provides a strong answer to the geographical barriers that have dogged the autism care in Pakistan (Wong, 2025). The areas of specialized services are concentrated in several urban locations, and in some rural regions, which are underserved, families could be assisted in timely evidence-based ways through telehealth. The financial impact is high since telehealth may lead to exponential savings on both families and providers in terms of mitigating the cost of travel, time off of work, and additional expenses (Wong, 2025).

Studies in other countries confirm the effectiveness of telehealth as an autism diagnosis and intervention method. Research has established that the diagnostic validity and diagnostic consistency of telehealth assessment and face-to-face assessments are very high, however, one review noted 80-91% accuracy. Telehealth evaluations are also highly rated by caregivers because they state that their children could feel more relaxed in a comfortable home setting. One of the fundamental aspects of this opportunity is the fact that digital tools can be delivered by people who do not specialize in this technology (Mukherjee, 2024). This can support the model of task sharing in which highly qualified professionals can concentrate on diagnosis and treatment planning with non-professionals or even trained parents conducting the interventions at a distance.

Learning and Daily Living Skills

Generally, assistive technologies (AT) fall into three categories, which are the low-tech, mid-tech, and high-tech devices and all offer support to the academic and daily life skills of individuals with ASD. Low-tech tools are adapted papers, visual schedules, which are also used to offer structure and predictability. Such devices as a tablet or special computer programs work particularly well when they are of high-tech. When it comes to academic needs, such apps as Flash to Pass can aid in learning math skills, and Book Creator can be used to express oneself in the form of personal stories and could be used to demonstrate emotions and issues. There are tech-driven innovations that can be used in areas outside the academic setting such as growth in

independence and in fine-tuning executive functioning. Neurodivergent people can be helped by the AI-powered tools like the Goblin Tools that help them to divide a complex project into several simpler steps and complete each step (Castro, 2024). In the same vein, "Neurotranslator" may also facilitate the social communication process through the analysis of the tones of messages and a clearer understanding of social intentions (Castro, 2024). These simple to extremely advanced tools offer a spectrum of assistance that can be customized to the unique situation of an individual to guide them through day to day life and remain focused on the task at hand.

What is New: Robotics and AI

Social robotics, artificial intelligence (AI) and the associated fields are presenting a prospective outlook of autism treatment. Social robots which are created to become the good attractor of individuals with ASD are considered as the medium that mediates and facilitates human to human interactions (Vahidi et al., 2017). It is recommended that the non-verbal and verbal communication behaviors could be greatly enhanced by interventions based on social robots and could enhance engagement, which is often a problem in conventional therapy. AI tools are an even higher form of technology application. In an example, the Superpower Glass Project makes use of an AI tool on the Google Glass that can give real-time cues of facial expressions to autistic children when they are socialising (Superpower Glass Project, 2018). It is difficult to say that this constant, non-interruptive feedback will not speed up the improvements in social skills due to the ability to understand and act in relation to social cues at the right moments (Superpower Glass Project, 2018). Although not yet ready and tested extensively, such technologies present considerable opportunities to develop highly personal, evidence-based and data-driven interventions with enough potential to realize effective solutions to highly complex and related social challenges that would otherwise not be realized through traditional methods.

Hurdles: The Situations of Non-adoption and Implementation in Pakistan

Although the possibilities of the digital and assistive technologies are endless, their implementation in Pakistan is limited by serious infrastructural drawbacks. One of the greatest hindrances is the digital divide. The availability of quality internet and electricity is not distributed, especially in rural and low-income places where the same individuals who would gain the greatest benefit of remote technologies cannot use them. The report on education gives the number as 22.8 million children between the ages of 5 to 16 who are out of school with huge differences depending on gender and location indicating a broader environment of inequality that can not be resolved by technology alone (UNICEF, 2024). Additionally, one of the barriers is the prohibitive nature of the digital devices themselves. This sets up a scenario in that the technology is harming the promise of democratizing access to care by threatening to increase the preexisting social-economic disparities. The gadgets and internet access are also left to the urban elite with the poorest of families left hopeless in the rural regions. One of the fundamental problems here is that technology is not a savior, it is merely a tool that needs an operating foundation. Absent active attempts to deal with these root causes, any technological intervention will simply be able to reach a tiny and wealthy section of the people.

Economic and Economic Constraints

The constraint of finances is a complex obstacle both of the families and the national system. Assistive technology devices and the use of hired therapists are cost-prohibitive in the case of families. World Bank notes that disability may contribute to poverty by raising the cost of living and reducing the chances to have a job (World Bank, 2024). The study on usage of assistive

technology in Pakistan has established the facts that the minimal use of AT are because of the lack of funds and that affordability and accessibility would be enhanced in case funding is available (Kamran & Bano, 2024). Systemically, documented AT adoption lack of funding at the national level. It implies that regardless of whether awareness and professional education would increase, the gadgets and services would not become available to most citizens (Kamran & Bano, 2024). The financial barrier is not the only individual problem of the students but also a systematic one, as it is reflected consistently in various researchers. Financial support of families and a national approach to financing technological solutions makes the whole care ecosystem ineffective. Such systemic funding issues are serious problems that need to be solved by any roadmap of technology adoption.

System and Human-Centered Obstacles

The ability of the human system that is supposed to utilize technology success lies within the success of its integration. One of the key concerns associated with Pakistan is that most of the healthcare workers and teachers are not trained, nor do they understand online literacy. A qualitative study of the implementation of telemedicine practice identified the following barriers associated with institutions, namely lack of training, poor administrative support, and digital illiteracy of medical workers (Mahdi et al., 2022). It can be reviewed that there is also a reluctance among teachers to use software of any kind, which means that more traditional, tactile devices can be preferred and that teachers lack knowledge and training on modern devices (Kamran & Bano, 2024).

Socio-cultural aspect of the adoption of technology.

Lastly, the success of technology interventions is inseparably connected to socio- Cultural aspects. An innovation invented in a wealthy state with a western background would not be culturally appropriate and could not reflect the experiences of a Pakistani family (Ahmad, 2015). Such technologies need to be context- and norm-sensitive (de Leeuw, 2020). In addition, it is possible that the stigmatization of autism will be an active hindrance to the use of technology. Although a family might have access to a cheap device and good internet connection, it can be afraid of being judged by others and lose desire to use digital tools to diagnose or treat a disorder (Special Education Department, 2024). A family may not request a distant diagnosis on a telehealth platform when they are afraid that with such an explanation of the situation, their child will become an outcast. This is to stress that technology is but a tool which even in the most developed form cannot work in isolation. These should be followed by effective culturally-sensitive public awareness campaigns that should deal with the causes of stigma and create a more accepting society.

Digital and Assistive Technologies for Autism Intervention in Pakistan: Devices, Mobile Applications, and Digital Tools

Authentication Autism Intervention with the help of technology in Pakistan is a fast-growing field of application in the previous few years, which provides new opportunities in the development of communication, learning, and therapy of children with Autism Spectrum Disorder (ASD). Mobile applications, special augmentative and alternative communication (AAC) devices, and other digital devices have the potential to fill in the gaps in autism support across schools, clinics and home settings with integration. Meanwhile, the barriers of cost, accessibility, language barrier, and the absence of professional training continue to be the key challenges. One of the most available types of digital interventions is mobile apps. The most popular is Cboard AAC,

which is a free web-based application and an Android and iOS application, where Urdu pack of languages is available, thus locally applicable. On the same note, another AAC talker is free software like LetMeTalk offering support in a variety of languages, including Urdu, and most commonly used by families and therapists in Pakistan to help non-verbal children. Another Android-based children with communication challenges tool, namely Jellow AAC Communicator can also be utilized in Urdu and has demonstrated potential to Pakistani users. Pyramid Educational Consultants developed PECSTalk as a digital implementation of Picture Exchange Communication System (PECS), and it is both Android and iOS based. One more innovative solution is to be referred to as Bolo Tech, the Urdu speech therapy app created by Pakistani students, which directly takes into consideration local linguistic requirements and emphasizes the opportunities of local digital innovations.

Other than mobile apps, there are also a few specialized AAC devices that are being used in Pakistan. GoTalk 9 Plus is a voice output communication device developed by Attainment Company which is officially purchased by the institutions like University of Health Sciences Lahore in order to clinically use it. In its accompaniment, one has the Picture Exchange Communication System (PECS) which is used as a part of therapy and educational program in which children are enabled to communicate by the use of structured picture cards. The tools prove that even the rather simple AAC tools become appreciated and included into intervention programs.

Besides these, importation of global AAC hardware solutions may sometimes be done to bring on clinical use when there is available funding. The Tobii Dynavox I-Series is a more complex speech generating tool with eye gaze interface, which has already been reported as part of repertoire of the specialized centers. The GoTalk family including GoTalk 4 Plus, GoTalk 9 Plus, GoTalk 20 Plus, and GoTalk Select have also been made available via global distributors and are slowly but surely being introduced in the context of autism therapy in Pakistan as well. The devices can support a spectrum of needs with low-tech computing support to much more advanced solutions, which are electronic. There are other digital tools facilitating this contribution, as well DIGITALLY EMBODIED PECS, which is its local version of the PECS system, has been tested through researches in Pakistan as one of the effective intervention to autistic children. Digital translations of the Modified Checklist for Autism in Toddlers (M-CHAT-R/F) have also been used to screen autism early and have been instrumental in bringing awareness as well as provide early diagnosis. In addition, a printable digital communication board called the Urdu Core Vocabulary Communication Board assists therapists and families in the promotion of AAC techniques in an appropriate manner that is free of culture and language constraints.

Irrespective of these developments, there have been challenges. The requirements that prohibit access to advanced AAC device like Tobii Dynavox I-Series to other than well-financed centers are costly. Even fairly inexpensive systems such as the GoTalk necessitate institutional purchases that are beyond the capacity of many schools and clinics. Although there are free or cheap alternatives like Cboard, LetMeTalk, and Jellow mobile applications, effective application is reliant on parent awareness, the availability of smartphones, and caregiver and therapist education. Such locally developed solutions as Bolo Tech have potential but need to be scaled, funded, and supported by the institutions to reach a dominant mass. To sum it up, it is quite possible to state that the balance between emergence and limitation is quite evident in the landscape of digital technologies and assistive technologies applied in the autism intervention in

Pakistan. Apps such as Cboard AAC, LetMeTalk, Jellow AAC Communicator, PECSTalk and Bolo Tech are improving accessibility whereas GoTalk 9 Plus and PECS Starter Kit are seen to have applications benefitting clinics. The intervention is extended by imported solutions such as Tobii Dynavox I-Series and broader GoTalk family or through more locally suited tools such as Digitally Embodied PECS, M-CHAT-R/F Urdu, or the Urdu Core Vocabulary Communication Board. Potential of these technologies in the future is to increase accessibility, affordability, as well as to give therapists, educators and families the training they require in order to maximize their effectiveness.

Discussion, and Recommendations

The review of digital and assistive technologies in the context of autism intervention in Pakistan shows a paradoxical picture of vast potential cooled by a high level of barriers that are closely interrelated. Technology is a potent change lever, which has the potential to be used to overcome barriers of geography, to lower the cost of care and to offer interventions that are highly motivating and personalised. The possibilities of telehealth to circumvent the urban-rural service gap and of AAC apps to provide agency to individuals with little productivity in words is revolutionary. There are extant parent-mediated intervention models, a tried-and-tested framework on which technology could escalate and multiply. Nonetheless, the success of the said technological revolution cannot be deemed as certain. The challenges identified: lack of a deep digital divide, financial uncertainties, a lack of professional training, and entrenched socio-cultural stigmas are not problems existing in a vacuum. They are a maze of multidimensional obstructions. As an example, an expensive device would become out of reach of low-income households, and the absence of training would imply that, even when the access to a device is gained, still, it might not be utilized properly. What is more, extensive stigma may even inhibit the initial step of the help-seeking process, and the whole technological ecosystem becomes irrelevant. The key conclusion of this report is that technology can be a change agent, one that can be applied most effectively when it is incorporated into a multi-dimensional approach that takes action across the interconnected tangle of barriers in a multi-faceted manner. There can be no single solution.

A Roadmap of Action of Multi-Stakeholders

The multidisciplinary approach should be used to work in landscape. A multi-stakeholder roadmap to action is presented below and covers the systemic, economic, and socio-cultural obstacles to clear the way to a more inclusive and technologically-empowered future of persons with ASD in Pakistan. Create and apply a unified national stance where the adoption of autism as a disability is abridged and technology is applicable within service delivering system. The legal background of the disabilities in its present form is not adequate, it does not deal specifically with the autism. Specific new policy designation would entrench the condition producing the ability to assign the specific budgetary resources to investigation, education and delivery of the service hence going past the existing unsecured and privately controlled approach. The actual policy will be a legal and institutional basis on all future attempts, announcing a governmental commitment, which is not present at the current point. This would also be a way into international cooperation and investment.

To the Healthcare Providers and Educational Institutions

Recommendation: Require and invest in intensive, hands-on curricula that target everything frontline workers need to know about ASD care and embracing technology: general practitioners,

pediatricians, teachers, and therapists. (Govt. In-Service Training College for the Teachers of Disabled Children, Lahore, 2024). This training is supposed to be concerned with identification at the early stage, diagnostics, and practical use of digital instruments within a therapeutic and educational context. Strategic Rationale: Expertise is a major target of diagnosis and intervention obstacle. This is a human capacity to be developed and a pre-condition to any effective technology-based intervention. Digitally literate and confidant workers who have confidence of their capacity to handle ASD will be a strong agent of change.

To civil society and Non-Government Organizations

Suggestion: Publicly announce large-scale culturally-sensitive awareness-raising campaigns through social and digital media to lower stigmatization and encourage early help-seeking (Dawn, 2025). The misconceptions need to be counters by the use of relatable stories, and simple, unambiguous messaging in these campaigns to draw families to seek the support of a professional without fear of judgment. Strategic Rationale: Stigma is the preliminary treatment of help seeking. Lack of this will make even the most developed and accessible technologies to lie idle. Especially social media has a much cheaper and broad access to provide the right information and can help create a more comprehensive society.

As a Technology Developer / Researcher

Recommendation: It is advisable to focus on local development and creation of affordable and cheap technology that is culturally-specific (Ahmad, 2015). This can be informed by a user-centered design approach and make active local parent, educators and children participation towards the development and testing of the design. It should be based on the research of the applicable effectiveness of these localized tools and on the cost-benefit analysis. Strategic Rationale: Western made apps which are generic might not work within the Pakistani cultural environment. Contextualized research should be conducted to develop tools that suit the cultural expectations and are affordable to the poor households to ensure that technology can be part of the solution that creates equity, and not an additional source of inequality.

Directions of Future Research

The existing literature on technology and autism in Pakistan is in its initial stages where most of the avenues are untapped. The following research directions are necessary in order to make future policy and practice informed Localized Efficacy and Cost-Benefit Encounters: A dire necessity is the research on the local cost-benefit ratio and efficacy of localized technologies, e.g. VR or telemedicine on the Pakistani setting (Malik, 2007). These experiments should be centred at application or implementation rather than done in laboratory environments. Longitudinal Studies: Future studies are recommended to focus on longitudinal research studies to determine what effects technologically based interventions have in terms of long-term developmental avenues and living standards of the affected persons with ASD (Batool & Khursheed, 2015). Family Dynamics: There is an opportunity to conduct further research into how using technology-assisted parent training influences parent stress and family cohesiveness, and, in general, the quality of life. Policy Implementation Research: A research to study the particular obstacles to policy implementation such as institutional resistance and administrative inertia is required to facilitate policy implementation, and such a study will help to drive advocacy for the purpose.

Conclusion

Even as the prevalence continues to increase, a fractured, under-resourced care system in Pakistan will have a significant impact on the prospective health effects. The use of digital and

assistive technologies provides a source of hope as they have developed a wide range of scale-up accessible resources that could fill in acute gaps in communication, diagnosis, and therapeutic support. The possibility to evade the conventional obstacles by means of these technologies cannot be doubted. Nonetheless, after the analysis presented in the report, it is evident that technology by itself cannot be the solution. It will only succeed when there is a multi-stakeholder effort with a concerted effort to overcome the structural infrastructural, economic, and socio-cultural systemic barriers that have traditionally developed around it. With the potential of technology, Pakistan can realize the full potential of a more affordable, less exclusive, and less stigmatizing approach to care among the population of individuals with autism by increasing human capacity, tackling financial limitations, refusing to accept social stigmas, and establishing a positiveist policy environment.

This report analysis has supported the above idea since the challenges that face the adoption of technology in Pakistan are not only held in isolation, but they constitute a multi-faceted web of issues that cannot be eliminated one by one. And the digital divide, to take but one example, is not really just the absence of access to the internet, but is rather systemic and ends up enhancing pre-existing socioeconomic inequalities. Assistive technology and private therapy services are expensive and the inability of families to afford them due to a lack of government funding and lack of insurance coverage can be an insurmountable financial burden on a family that drives them further into poverty. Likewise, adopting the advanced technology is hindered by the absence of professional training and digital know-how of educators and health workers, despite the availability and the affordability of the technology.

All this is also complicated by an extensive cultural stigma that may very well stop a family seeking help in the first place, and therefore any technological solution will be ineffective unless it is supported by widespread social campaigns on the same topic. The results point to the fact that technology can not become a transformative force in isolation and aspects of holistic, multi-prong Facebook Idea of application serve as value-added course of actions. It would involve the profound transformation of the institutional attitude and a readiness to implement and apply implemented policies on persons with disabilities (Kamran & Bano, 2024). A major opportunity is to scale up interventions with demonstrated positive impacts, particularly those based on evidence. The effectiveness of the parent-mediated intervention programs, as one example, proves that parents may act as potent agents of change, provided they have the necessary tools and various training. This model can be increased with the help of technology-facilitated platforms that can deliver remote yet affordable training to significantly more people and save the time of a very limited number of specialists. Nevertheless, all these technical solutions should be designed on a local/cultural level to be effective and appeal to the experiences of Pakistani families. A uniform solution of western models will hardly work.

Finally, the future of autism care in Pakistan is less about the technology where it is housed and promoted, and more about the ecosystem that surrounds it. An important initial step would be a national policy that formally acknowledges autism, and this in turn would establish the legal and financial infrastructure around which the longer-term work could be achieved. This should be complemented with strategic investment in professional capacity-development, public-private collaboration to enable technology become more affordable and accessible, and national awareness campaigns to break the social taboos that caused family isolation, over long years. It is only under this multi-stakeholder and integrated strategy that Pakistan can be on the path of

an inclusive and equitable future, in which technology becomes a tool to bridge autistic people in Pakistan rather than act as a barrier.

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