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Telerehabilitation Services in India: an Integrated SWOT and AHP Analysis

[1]Sheetal Kalra
[2]Puneeta Ajmera
[3]Varsha Chorsiya
[4]Sheetal Yadav
[*5]Sonia Pawaria
[6]Ramesh K Goyal

ABSTRACT

Background: Telerehabilitation involves delivering rehabilitation services to patients utilizing information and communication technologies. The objective of this research was to analyze and prioritize strengths, weaknesses, opportunities, and threats (SWOT) for the technology associated with the rehabilitation of patients.

Methods: The study's first phase involved enlisting factors relevant to telerehabilitation in India, followed by a Delphi study with a panel of experts to reach a consensus for SWOT analysis. Then, a pairwise comparison among various SWOT factors was made using Analytical Hierarchical Process (AHP). Finally, consistency Ratio (CR) values were calculated.

Results: Sixty significant factors relative to the telerehabilitation sector in India were identified from a review of existing literature and presented to experts. After four rounds of Delphi, thirteen strengths, eleven weaknesses, four opportunities, and five threats were selected. CR values in the present study were less than 0.10 for all SWOT sub-groups indicating that the pairwise comparisons done by the decision-makers were fairly consistent.

Conclusion: Delphi technique helped in identifying various SWOT factors associated with telerehab which were assigned a rank by the Strategic analysis technique. The highest priority strength lies in an online consultation on an urgent basis followed by cost-effectiveness, time-saving and reduced hospitalization. The telerehabilitation model weakens when direct contact for therapy, reliable internet access is required. Funding and grant opportunities to expand tel rehab in India and provide standard expert care for vulnerable populations are viewed as future scope. Threats identified were lack of direct supervision and cybersecurity. Understanding and addressing these factors can help in the successful implementation of telerehabilitation in India.

Keywords: Telerehabilitation, SWOT analysis, Analytical Hierarchical Process (AHP), Delphi, Prioritization.

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[1]Associate Professor, School of Physiotherapy, Delhi Pharmaceutical and Research University, Delhi.
E-mail: sheetalkalra1237@gmail.com
[2]Associate Professor, School of Allied Health Sciences, Delhi Pharmaceutical and Research University, Delhi.
E-mail: id-puneeta_22@yahoo.com
[3]Assistant Professor, School of Physiotherapy, Delhi Pharmaceutical and Research University, Delhi.
E-mail: vkchorsiya@gmail.com
[4]Assistant Professor, School of Allied Health Sciences, Delhi Pharmaceutical and Research University, Delhi.
E-mail: id-sheetalyadav.ihmr@gmail.com
[6]Professor, Delhi Pharmaceutical and Research University, Delhi.
E-mail: id-goyalrk@gmail.com

CORRESPONDING AUTHOR

[*5]Sonia Pawaria

Associate Professor, Faculty of Physiotherapy, SGT University, Gurugram.
E-mail: id-sonia@sgtuniversity.org

INTRODUCTION

The fourth industrial revolution has resulted in an augmented growth in technology. It has also impacted the health care system, including the field of rehabilitation. Tele rehabilitation is a healthcare approach based on Information and Communication Technology that receives considerable attention from Rehabilitation professionals worldwide [1,2]. It can be considered a substitute and ingenious method in healthcare that has connected people in need of rehabilitation with the provider of health care services cost-effectively and straightforwardly [3]. Under the umbrella term telerehabilitation, various Rehab services are offered to the patients in different forms like assessment, consultation, conference calling, education, remedies, and providing instructions. It can be provided in various ways, including audio, video, e-consultation, virtual check-ins, telephonic assessments, and recorded videos [4].

An upswing in telerehabilitation programs is seen nowadays because of technology development and increased awareness among the service providers and end-users. Researches have reported the utilization of tele rehab services in various forms like tele pain, tele neurology, tele stroke, and telemonitoring for rehabilitation of patients with various musculoskeletal, neurological, and cardiopulmonary conditions [5,6,7,8]. Telerehabilitation has also emerged as one of the solutions during the Covid-19 pandemic for facilitating continuity of care and support to patients and families in need of rehabilitation [9]. It has been delivered utilizing different modalities and to the varied population during the covid era [10].

As one of the world's rapidly developing economies, India is also facing challenges concerning the health sector. The burden of disability in India is high because of the increased prevalence of non-communicable diseases (NCD), resulting in functional and mental health consequences requiring comprehensive management [11,12]. In terms of years lived with disability (YLD), NCDs have surpassed communicable diseases in India [13]. According to a report by WHO, about a fifth of all deaths occurs in India. One of the evidence-based methods for managing NCD is rehabilitation which is considered a vital means to reduce morbidity, mortality, and disability associated with NCDs [14]. For resource-constrained countries like India, rehab provision may be challenging with respect to limited infrastructure, facilities, and availability of Rehab professionals, leading to a significant gap in treatment. Telerehabilitation could be a medium of intervention to reduce this gap. India has recently witnessed an upsurge in the provision of technology-based rehabilitation [15]. Providers of rehabilitation services may use telerehabilitation to deliver care to patients. Still, at the same time, it becomes crucial to analyze strengths, weaknesses, opportunities, and threats (SWOT) for any technology associated with the rehabilitation of patients. Also, to provide quality health care services effectively and efficiently, strategic decision-making is critical.

SWOT analysis is a method for assessing intrinsic and extrinsic environments to obtain and support a systematic approach for decision-making situations [16]. Strength can be defined as the advantages or benefits of a particular technology over other existing technologies. Weakness can be defined as the factors that can reduce the optimal performance of any technology and hence put them at a disadvantage over others. Opportunities are the favorable factors that a particular technology can exploit to its advantage. Threats can be defined as elements that can harm a particular technology. SWOT analysis would identify strong points (strengths) and opportunities that need to be maximized in telerehabilitation. Also, it would identify weak points and risks that need to be minimized or reduced towards advancing and monitoring telerehabilitation in context to the Indian health care system. SWOT analysis has been conducted to identify potential benefits and limitations related to strategic decision-making in telehealth [17,18].

The Delphi technique was used in the present study to identify various strengths, weaknesses, threats, and opportunities associated with telerehabilitation. Delphi technique is a worldwide accepted method utilized in varying fields in which data is collected from experts restricted to their realms. It is a group communication technique whose purpose is to build consensus on some real issue before converging opinions from a panel of selected experts [19]. It is utilized as an essential research tool in exploring alternative findings and discovering unknown facts. Research by Kristian et al. did Delphi study to find the effectiveness of telemedicine-based services to assist in decision making in the healthcare system [20]. Delphi studies with experts have been used in health sciences to reach a consensus on tele health-related activities and competencies [21].

Analytical determination of the strength of various factors is not possible with SWOT analysis. So, the fit between the intrinsic and extrinsic factors cannot be determined. Inability to detect the best strategy for a decision-making situation and lack of hierarchy leads to analytical and systematic deficiencies. So it is sometimes integrated with other techniques Like Analytical Hierarchy Process [22]. AHP is the most extensively used multi-criteria-based method of decision-making that helps in a more holistic understanding of the problem and gives a framework for deciding on the best option, resulting in more long-term planning and management. Pairwise comparison among factors is done in the AHP technique to protect them [23]. Integrating the AHP technique with SWOT analysis provides quantitative information, which is the basis for strategic planning. It quantifies the relative importance of different SWOT factors [24].

The study's objective was to analyze and prioritize strengths, weaknesses, opportunities, and threats (SWOT) for telerehabilitation services in India using an integrated SWOT and AHP analysis. However, to the author's best information, no study has been conducted with the

methodology adopted in this study.

METHODOLOGY

Ethics

Since the present study has not involved participants who were required to perform actions or foist certain behaviors upon them, the study was not submitted for institutional ethical clearance. Consequently, all necessary care was taken to protect the experts' identity and privacy and voluntary participation.

The duration of the study, including data compilation, analysis, and report writing, was three months, from November 2020 to January 2021.

This study had three phases:

(1) Enlisting of factors relevant to telerehabilitation in India.
(2) A Delphi study with experts was carried out to reach a consensus for SWOT analysis.
(3) A pairwise comparison among various SWOT factors was done using Analytical Hierarchical Process (AHP). As a result, consistency Ratio (CR) values were calculated.

Enlisting of factors

A list of sixty significant factors relative to the telerehabilitation sector in India was identified from the review of existing literature by the researchers. Content analysis was done using publications related to telerehabilitation studies conducted in India and abroad. The main objective was to identify SWOT factors associated with telerehabilitation services. This research was conducted in a content analysis method. The identified Strengths, Weaknesses, Opportunities, and threats were noted in a tabulated manner.

Delphi rounds with experts

A panel of twelve experts (eight from the healthcare industry and four from academia) having adequate knowledge and experience in telerehabilitation was taken for the present study. Identified SWOT factors were presented to experts, and after four rounds of Delphi, thirteen strengths, eleven weaknesses, four opportunities, and five threats appropriate for the Indian telerehabilitation sector were selected. These factors are presented in table 1.

Table 1: SWOT analysis of Indian telerehabilitation sector

Strengths	**Weaknesses**
S1: Online consultation on an urgent basis possible for Acute cases S2: Cost-effectiveness S3: Overcome physical barriers and transportation constraints. Saves traveling time S4: Reduces Hospitalization for Rehabilitation S5: Reduces caregiver burden S6: Possible to initiate early rehab S7: Better continuity of care S8: Robotics can be integrated for live monitoring of Cardiac and Neuro Patients S9: Monitoring of Rehab parameters in patients with chronic diseases S10: High-risk patients can be catered at home, ensuring patient and staff safety S11: Boon for researchers and people working from home S12: Reduces patient overcrowding in Rehab centers S13: Feasible and convenient to provide	W1: Electrotherapy, equipment, and manual therapy based rehabilitation not feasible W2: Poor Internet accessibility W3: Lack of Realistic approach -Face to face communication. W4: Difficult to train therapists and patients to adopt technology-based virtual rehab W5: Casual approach w.r.t. learning and training W6: Poor acceptance W7: Limited ability to evaluate and examine patients W8: Reduced motivation in patients needing continued care, especially Neuro patients W9: Internet accessibility W10: Failure of technology for virtual Rehab W11: Lack of research on strategic implementation of Tele-rehabilitation
Opportunities	**Threats**
O1: Ability to connect rehab consultants across the globe O2: Government Support O3: Great opportunity during such humanitarian crises O4: Possibility of providing rehab services to the geographically displaced population	T1: The absence of direct supervision increases the risk of injury to a patient T2: Higher chances of learning wrong exercises/movement pattern T3: Cybersecurity T4: Ethical liabilities T5: Unaddressed malpractices

Analytical Hierarchy Process (AHP)

A pairwise comparison among factors is done in the AHP technique using Satty's nine point pairwise comparison scale shown in table 2.

Table 2: Pairwise comparison scale [25]

Importance	Explanation
1	Equally preferred
2	Equally to moderately preferred
3	Moderately preferred
4	Moderately to strongly preferred
5	Strongly preferred
6	Strongly to very strongly preferred
7	Very strongly preferred
8	Very to exceptionally strongly preferred
9	Extremely preferred

Following steps were undertaken in the process-

1. After identification of SWOT factors, pairwise comparison of SWOT group is performed using Saaty's scale as shown in tables 3 to 6.
2. Pairwise comparison values in each column are summed up. Each sum is then multiplied by the respective weight for that criterion to calculate the priority vector for all SWOT factors. Finally, the priority vector values are added together to obtain Lambda-max for each sub-group.
3. Consistency Index (CI) is calculated using the formula CI = (Lambda-max –n) / (n–1), where n is the number of criteria that are compared.
4. Next step involves a calculation of Consistency Ratio (CR) by division of Consistency Index (CI) (from the previous step) by a Random Index (RI) by Satty, which is determined by table 7. The Consistency Ratio (CR) tells about the consistency of decision-maker while making the pairwise comparisons. If the Consistency Ratio (CR) is less than 0.10, the decision-makers pairwise comparisons are relatively consistent. CR values calculated in the present study are less than 0.10 for all SWOT subgroups.
5. Finally, SWOT factors were prioritized according to the values of priority vectors and depicted in tables 8

Table 3: Comparison matrix for Strengths done pairwise

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
S1	1	2	3	0.25	0.16	1	3	4	0.2	1	4	0.14	0.33
S2	0.5	1	2	0.16	0.142	1	4	6	0.2	0.25	3	0.14	0.5
S3	0.33	0.5	1	0.2	0.14	0.25	1	5	0.16	0.16	4	0.16	0.2
S4	4	6	5	1	0.12	1	3	6	0.25	2	4	1	0.5
S5	6	7	7	8	1	8	9	9	2	7	9	2	4

S6	1	1	4	1	0.12	1	3	5	0.25	0.5	5	0.16	0.14
S7	0.33	0.25	1	0.33	0.11	0.33	1	2	0.16	0.25	2	0.14	0.16
S8	0.25	0.16	0.2	0.16	0.11	0.2	0.5	1	0.2	0.16	1	0.12	0.12
S9	5	5	6	4	0.5	4	6	5	1	3	7	0.5	1
S10	1	4	6	0.5	0.14	2	4	6	0.33	1	3	0.14	0.5
S11	0.25	0.33	0.25	0.25	0.11	0.2	0.5	1	0.14	0.33	1	0.12	0.12
S12	7	7	6	1	0.5	6	7	8	2	7	8	1	3
S13	3	2	5	2	0.25	7	6	8	1	2	8	0.33	1
PV	**0.136**	**0.15**	**0.024**	**0.118**	**0.187**	**0.039**	**0.021**	**0.012**	**0.033**	**0.084**	**0.015**	**0.082**	**0.097**

Table 4: Comparison matrix for Weaknesses done pairwise

	W1	**W2**	**W3**	**W4**	**W5**	**W6**	**W7**	**W8**	**W9**	**W10**	**W11**
W1	1	0.2	0.33	0.16	0.33	0.25	0.25	2	0.12	0.2	0.5
W2	5	1	4	5	6	7	7	5	2	6	7
W3	3	0.25	1	0.5	2	4	0.33	2	0.16	0.2	2
W4	6	0.2	2	1	3	4	2	5	1	2	4
W5	3	0.16	0.5	0.33	1	0.5	0.2	1	0.2	0.25	2
W6	4	0.14	0.25	0.25	2	1	0.25	2	0.16	0.25	3
W7	4	0.14	3	0.5	5	4	1	4	0.5	3	6
W8	0.5	0.2	0.5	0.2	1	0.5	0.25	1	0.2	0.25	2
W9	8	0.5	6	1	5	6	2	5	1	2	6
W10	5	0.16	5	0.5	4	4	0.33	4	0.5	1	5
W11	2	0.14	0.5	0.25	0.5	0.33	0.16	0.5	0.16	0.2	1
PV	**0.022**	**0.303**	**0.054**	**0.122**	**0.032**	**0.039**	**0.115**	**0.027**	**0.165**	**0.099**	**0.023**

Table 5: Comparison matrix for Opportunities done pairwise

	O1	**O2**	**O3**	**O4**
O1	1	0.14	0.33	1
O2	7	1	6	9
O3	3	0.16	1	5
O4	1	0.11	0.2	1
PV	**0.069**	**0.68**	**0.192**	**0.057**

Table 6: Comparison matrix for Threats done pairwise

	T1	**T2**	**T3**	**T4**	**T5**
T1	1	1	2	5	6
T2	1	1	3	4	3
T3	0.5	0.33	1	5	2
T4	0.2	0.25	0.2	1	3
T5	0.17	0.33	0.5	0.33	1
PV	**0.34**	**0.32**	**0.18**	**0.085**	**0.064**

Table 7: Random Consistency index

N	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Random Index (RI)	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56

RESULT

In the current study, thirteen strengths, eleven weaknesses, four opportunities, and five threats of the telerehabilitation sector in India were identified. A prioritization matrix was constructed using Analytical Hierarchy Process, a Multiple Characteristic Decision-Making Technique. Priority scores of all SWOT factors are depicted in table 8. Results depict that "Online consultation on urgent basis possible for Acute cases" turned out to be the biggest strength followed by "cost-effectiveness" and "saves traveling time." Telerehabilitation technologies allow patients to take urgent online consultations and stay in touch with the therapist for further guidance without making tiring journeys. However, the biggest weakness observed was "Electrotherapy and equipment-based rehabilitation not feasible," followed by "internet accessibility." Internet accessibility is a mandatory prerequisite for telerehabilitation services. Remote penetration of the internet is therefore significant for its successful execution. "Ability to connect with rehabilitation consultants across the globe" was reported to be the topmost opportunity. Finally, "Absence of direct supervision increases risk" was rated as the biggest threat for the Indian telerehabilitation sector. The Indian government is making all efforts from improving internet bandwidth in rural areas where its significant population is concentrated to initiating policies and guidelines for successful telerehabilitation services. Recognition of strengths and weaknesses, opportunities, and threats help in exploring the inherent capacity and limitations of organizations involved in telerehabilitation services in India.

Table 8: Priority scores for SWOT Factors

Strengths	**Description**	**Priority vector**	**Rank**
SI	Online consultation on urgent basis possible for Acute cases	0.136	3
S2	Cost-effectiveness	0.15	2
S3	Overcome physical barriers and transportation constraints. Saves traveling time	0.024	10
S4	Reduces Hospitalization for Rehabilitation	0.118	4
S5	Reduces Caregiver burden	0.187	1
S6	Possible to initiate early rehab	0.039	8
S7	Better continuity of care	0.021	11
S8	Robotics can be integrated for live monitoring of Cardiac and Neuro Patients	0.012	13
S9	Monitoring of Rehab parameters in patients with chronic diseases	0.033	9
S10	High risk patients can be catered at home, ensuring patient and Staff safety	0.084	6
S11	Boon for researchers and people working from home	0.015	12
S12	Reduces patient overcrowding in Rehab centers	0.082	7
S13	Feasible and convenient to provide	0.097	5
Weakness	**Description**	**Priority vector**	**Rank**
W1	Electrotherapy, equipment and manual therapy based rehabilitation not feasible	0.022	11
W2	Poor Internet accessibility	0.303	1
W3	Lack of Realistic approach -Face to face communication.	0.054	6

W4	Difficult to train patients to adopt technology based virtual rehab	0.122	3
W5	Casual approach w.r.t. learning and training	0.032	8
W6	Poor acceptance	0.039	7
W7	Limited ability to evaluate and examine patients	0.115	4
W8	Reduced motivation in patients needing continued care, especially Neuro patients	0.027	9
W9	Failure of technology for virtual rehab	0.165	2
W10	Illiteracy	0.099	5
W11	Lack of research on strategic implementation of Tele-rehabilitation	0.023	10
Opportunities	**Description**	**Priority vector**	**Rank**
O1	Ability to connect consultants across globe	0.069	3
O2	Government Support	0.681	1
03	Great opportunity during humanitarian crises	0.192	2
O4	Possibility of providing rehab services to geographically displaced population	0.058	4
Threat	**Description**	**Priority vector**	**Rank**
T1	Absence of direct supervision increases risk	0.34	1
T2	Chances of learning wrong exercises	0.32	2
T3	Cyber security and confidentiality	0.18	3
T4	Ethical liabilities	0.085	4
T5	Unaddressed malpractices	0.064	5

DISCUSSION

For a developing nation like India, struggling with a shortage of rehabilitation professionals and a mounting burden of disease and disability, telerehabilitation can be considered a viable health care tool for providing rehabilitation to patients. However, the integration of telecommunication technology for the rehabilitation of patients in a productive manner requires an adequate fit between internal and external factors associated with this technology. The present study intended to critically evaluate India's telerehabilitation services in light of integrated SWOT and AHP analysis. Delphi technique helped identify various benefits, limitations, and challenges associated with tele rehab, which were assigned a rank by the Strategic analysis technique. Out of 60 identified factors, 33 were classified into Strengths, Weaknesses, Opportunities, and Threats. When this virtual platform of telerehabilitation has become neo normal in the COVID era, it's become of utmost significance to conduct this research work to develop a vision and plan to control weaknesses and threats and take the strengths and opportunities to a newer horizon.

Strengths

The highest priority strength lies in the online consultation on an urgent basis possible for acute cases followed by cost-effectiveness, time-saving, and reduced hospitalization in the present study. Telerehabilitation added usefulness by attenuating COVID-19–related harm and influencing recovery [26, 27]. It has helped to overcome obstacles like physical barriers and transportation worries, thus saving time. Telerehabilitation can be used to facilitate efficient and cost-effective rehabilitation services to patients suffering from chronic diseases.

Weakness

The telerehabilitation model weakens when direct contact for therapy is required. There is a limited scope of performing examination or treatment via electrotherapy, equipment-based exercises, or manual therapy techniques. The modus operandi of the telerehabilitation landscape requires reliable broadband internet access that could be a problem many times, limiting the clarity and might interfere in the delivery of services. Lack of face-to-face contact and inability to develop patient therapist relationship and rehabilitation at home, which is circumstantially different from clinical settings, are other weaknesses of this model. Both therapist and patient have to get literate to use the virtual technology aptly to bridge the unrealistic nature of the approach in face-to-face communication. As a more significant number of collaborators acknowledge the importance of telerehabilitation fathered by the Covid-19 pandemic, more endeavors are needed to address the above-mentioned unfavorable situations or barriers that can limit the achievement of telerehabilitation goals in India.

Opportunities

The possibility of providing standard and economic care by experts from across the globe for vulnerable and geographically displaced populations can also be viewed as a future scope in the field of rehabilitation in India. Telerehab can also be an excellent opportunity to serve during humanitarian crises like the Covid-19 pandemic, which has impacted all facets of the healthcare delivery system across the globe. Social distancing, while needful, has little work of rehabilitation professionals since they work in close connection with the patients. This has affected people with disabilities in urgent need of rehabilitation and professionals suffering due to decreased practice and income. Telerehab can be a solution to these afflictions as it may allow access to rehabilitation care. Funding and grant opportunities by the government to expand tel rehab in India are viewed as another great opportunity. Remote locations in India often suffer from a shortage of resources and rehabilitation experts, which are crucial for delivering rehabilitation services and can adversely impact the quality of care provided to the patients.

Threats

The threats that are sometimes troubleshooting are the cases where direct supervision is required and where wrongly learned or performed exercise or maneuver can result in deterioration and harm. The threats are magnified on the premise cybersecurity and confidentiality that plays confounding role and open route to malpractice compromising ethical liabilities. However, threats that exist can be tackled with enhanced encouragement and

indulgence of the field proponents.

Furthermore, with the advent of technologies in the healthcare system, there could be a balance between strength and weakness or opportunities and threats. The "neo-normal" increased the weight towards strength and opportunities by decreasing the chances of weaknesses and threats. Based on this integrated SWOT and AHP analysis model, it's the need of the hour to develop specialty-specific guidelines and recommendations for telerehabilitation. If successful, then such a model will prove promising to reach the remotes parts of developing India.

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Conflict of Interest-Nil

REFERENCES

[1] Brennan DM, Mawson S, Brownsell S. erehabilitation: Enabling the remote delivery of healthcare, rehabilitation, and self management. Stud Health Technol Inform. 2009;145:231–48. [PubMed]

[2] Peretti A, Amenta F, Tayebati SK, Nittari G, Mahdi SS. Telerehabilitation: Review of the State-of-the-Art and Areas of Application. *JMIR Rehabil Assist Technol*. 2017;4(2):e7. Published 2017 Jul 21. doi:10.2196/rehab.7511

[3] Tyagi N, Aikat R, & Pratap J. Tele-rehabilitation as an adjunct service for geri care: Reaching the unreached. *Medical Science*. 2015;*4*(7), 19-21.

[4] Prvu Bettger J & Resnik, LJ Telerehabilitation in the age of COVID-19: an opportunity for learning health system research. *Physical Therapy*. 2020; *100*(11), 1913-1916.

[5] Palyo SA, Schopmeyer KA, & McQuaid JR. Tele-pain management: Use of videoconferencing technology in the delivery of an integrated cognitive–behavioral and physical therapy group intervention. *Psychological services*.2012; *9*(2): 200-202. doi: 10.1037/a0025987. PMID: 22662734.

[6] Appleby E, Gill ST, Hayes LK, Walker TL, Walsh M, Kumar S. Effectiveness of telerehabilitation in the management of adults with stroke: A systematic review. *PLoS One*. 2019; 14(11):e0225150. Published 2019 Nov 12. doi:10.1371/journal.pone.0225150

[7] Piotrowicz E, Jasionowska A, Banaszak-Bednarczyk M, Gwilkowska,J & Piotrowicz, R. ECG telemonitoring during home-based cardiac rehabilitation in heart failure patients. *Journal of telemedicine and telecare*.2012;*18*(4):193-197. doi: 10.1258/jtt.2012.111005 [Medline: 22604276]

[8] Piotrowicz E Baranowski R, Bilinska M, Stepnowska M, Piotrowska M, Wójcik A & Piotrowicz R. A new model of home-based telemonitored cardiac rehabilitation in patients with heart failure: effectiveness, quality of life, and adherence. *European journal of heart failure*. 2010; *12*(2), 164-171.

[9] Thompson LA, Rasmussen SA. What does the coronavirus disease 2019 (COVID-19) mea for families? *JAMA Pediatr*. 2020. doi:10.1001/jamapediatrics. 2020.0828;13,14

[10] Rosen K., Patel M, Lawrence C & Mooney B. Delivering Telerehabilitation to COVID-19 Inpatients: A Retrospective Chart Review Suggests It Is a Viable Option. *HSS Journal®*.2020; *16*(1): 64-70. doi: 10.1007/s11420-020-09774-4. PMID: 32837409; PMCID: PMC7364751.

[11] Arokiasamy P. India's escalating burden of non-communicable diseases. The Lancet Global Health.2018;6(12):e1262-e1263

[12] Sharma R. Epidemiology of Musculoskeletal Conditions in India. New Delhi, India: Indian Council of Medical Research; 2012.

[13] Khan F, Amatya B, Mannan H, Rathore FA. Neurorehabilitation in developing countries: Challenges and the way forward.Phys Med Rehab Int.2015;2(9):1-13

[14] Kamenov K, Mills J-A, Chatterji S, *et al.* Needs and unmet needs for rehabilitation services: a scoping review. Disabil Rehabil.2019; **41**:1227–37.doi:10.1080/09638288.2017.1422036

[15] Khanna M, Gowda GS, Bagevadi VI Gupta A, Kulkarni K, Shyam RPS. & Math, S B. Feasibility and utility of tele-neurorehabilitation service in India: Experience from a quaternary center. *Journal of neurosciences in rural practice*. 2018:*9*(4), 541-544. doi:10.4103/jnrp.jnrp_104_18

[16] Ajmera, P. Ranking the strategies for Indian medical tourism sector through the integration of SWOT analysis and TOPSIS method. *International journal of health care quality assurance*. 2017;30(8):668-679

[17] Wootton R Jebamani LS, & Dow SA. E-health and the Universitas 21 organization: 2. Telemedicine and underserved populations. *Journal of Telemedicine and Telecare*. 2005; *11*(5), 221-224.

[18] Düking P, Holmberg HC, & Sperlich B. The potential usefulness of virtual reality systems for athletes: a short SWOT analysis. *Frontiers in Physiology*. 2018; *9*:128. doi:10.3389/fphys.2018.00128

[19] Hsu CC & Sandford BA. The Delphi technique: making sense of consensus. *Practical Assessment, Research, and Evaluation*.2007; *12*(1), 10.

[20] Kidholm K, Jensen LK, Kjolhede T.Validity of model for assessment of telemedicine: A Delhi Study.2018;24(2):118-125.

[21] Cornelis TM. V an Houwelingen, Anna H. Moerman, Roelof G.A. Ettema, Helianthe S.M. Kort, Olle ten Cate. Competencies required for nursing telehealth activities: A Delphi-study.Nurse Education Today. 2016;39:50-62

[22] Ali Görener, Kerem Toker, Korkmaz Uluçay, Application of Combined SWOT and AHP: A Case Study for a Manufacturing Firm, Procedia - Social

and Behavioral Sciences.2012;58: 1525-1534,https://doi.org/10.1016/j.sbspro.2012.09.1139.
[23] Cancela J, Fico G, Arredondo Waldmeyer MT. Using the Analytic Hierarchy Process (AHP) to understand the most important factors to design and evaluate a telehealth system for Parkinson's disease. BMC Med Inform Decis Mak. 2015;15 Suppl 3(Suppl 3):S7. doi: 10.1186/1472-6947-15-S3-S7. Epub 2015 Sep 4. PMID: 26391847; PMCID: PMC4705498.
[24] Fadim Yavuz, Tüzin Baycan. Use of Swot and Analytic Hierarchy Process Integration as a Participatory Decision Making Tool in Watershed Management, Procedia Technology.2013;8:134-143,https://doi.org/10.1016/j.protcy.2013.11.019.
[25] Saaty, T. L., & Vargas, L. G. *Decision making with the analytic network process.2006;* 282. Springer Science Business Media, LLC.
[26] Turolla, A., Rossettini, G., Viceconti, A., Palese, A., & Geri, T. Musculoskeletal physical therapy during the COVID-19 pandemic: is telerehabilitation the answer?. *Physical therapy*.2020; *100*(8):1260-1264.
[27] Exum E, Hull BL, Lee AC, Gumieny A, Villarreal C, Longnecker D. Applying telehealth technologies and strategies to provide acute care consultation and treatment of patients with confirmed or possible COVID-19. Journal of Acute Care Physical Therapy. 2020 Jun 15;11(3).