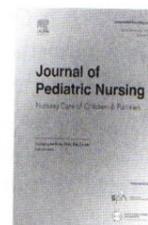




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The concept of telemedicine in pediatric rheumatology in Tunisia: Parents' perceptions

Yasmine Makhoulf^{b,*}, Dorra Ben Nessib^{a,b}, Hanene Ferjani^{a,b}, Wafa Triki^{a,b}, Kaouther Maatallah^{a,b}, Kaffel Dhia^{a,b}, Wafa, Hamdi^{a,b}

^a University of Tunis El Manar Faculty of Medicine of Tunis, Tunis, Tunisia

^b Mohammed Kassab National Institute of Orthopaedics, Rheumatology department, La Mannouba, Tunisia

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ABSTRACT

Introduction: With the COVID-19 pandemic, health care systems are facing challenges in delivering proper patient care. Children and adolescents with juvenile idiopathic arthritis require specialized and comprehensive attention. In this context, telemedicine is an alternative that has the potential to improve access to healthcare in addition to cost savings.

The objective of our study was to evaluate parents' willingness for telemedicine and factors helping to adopt this alternative in the era of COVID-19.

Methods: We undertook a cross-sectional study via structured phone interviews of parents' JIA patients as well as those with no established diagnoses. We evaluated their point of view and willingness to adhere to TM.

Results: The study included 40 parents. The main reasons for favoring TM were avoiding hospitals during the pandemic (32.5%), time saving (27.5%) as well as avoiding school absenteeism (27.5%). The main reasons for preferring a live consultation were the fear of a possible discrepancy between physical and distant evaluation (47.5%) and the fear of the trivialization of the disease (38.5%). There was no association between preference for TM and a family history of COVID-19 ($p = 0.704$) as well as electronic devices afforded ($p = 0.263$). However, patients who lived away from hospital, not familiar with the concept of TM and with higher income adhered less to TM.

Conclusion: Unlike the literature data, our study showed the low prevalence of parents willing to accept TM as a model of care. This implies an urgent need for parent and patient education to promote TM especially in pediatric rheumatology.

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Introduction

With the COVID-19 pandemic, health care systems are facing challenges in delivering proper patient care. This concerns rheumatologic centers being located in urban areas with shortages within the periphery (Caso et al., 2022). However, the advent of the virus gave us the opportunity to overcome these barriers and speed up the spreading of the concept of telemedicine (TM). Indeed, the COVID-19 has sparked a rapid expansion of TM and its implementation in several specialties (Battafarano et al., 2018). According to the World Health Organization, TM is defined as the use of various telecommunication technologies, for the exchange of valid information for diagnosis, treatment, and

prevention of diseases, especially where distance is a critical factor (Parikh et al., 2014).

This digital innovation is an alternative that has the potential to improve access to healthcare in addition to cost savings. Particularly, pediatric rheumatology is gaining importance across the globe despite the shortage of providers (Migowa et al., 2021). The Arthritis Foundation estimates that there are nearly 300,000 children with juvenile idiopathic arthritis (JIA), but fewer than 400 board-certified pediatric rheumatologists in the United States (Migowa et al., 2021). Similarly, there is a wide disparity in the standard of healthcare in Africa as this specialty exists only in 10 of the 54 countries in Africa (Trace et al., 2020). In fact, TM has found wider application in pediatric rheumatology since it opens up opportunities not only to make a diagnosis when local expertise is lacking but also to monitor children when access is not possible (Migowa et al., 2021). Before the pandemic, only few studies focused on TM in pediatric rheumatology, especially on the

* Corresponding author.

E-mail addresses: yasmine.mkhoulf@gmail.com (Y. Makhoulf), lassoued.hanene@rns.tn (H. Ferjani).

parents' perception of TM (Pooni et al., 2021; Ray et al., 2017; Russo et al., 2017), and in most of them, in-person visits were preferred to TM (Kessler et al., 2016; Solomon & Rudin, 2020).

Therefore, the aim of our study was to evaluate parents' willingness for TM in Tunisia and factors helping to adopt this alternative in the era of COVID-19.

Methods

We undertook a cross-sectional study among the parents of patients who visited our pediatric rheumatology department at least once. They were invited to answer a questionnaire via a phone interview between the period of June and July 2021. Information collected included demographic parameters, household income, and disease duration. We evaluated their point of view and willingness to accept TM by inquiring about the distance to go to the hospital, electronic devices, personal barriers to telemedicine, and reasons for adopting this alternative. Then, we compared the sociodemographic outcomes between the two groups: TM versus live consultation (LC). Willingness to TM was defined as favorably disposed in mind to adopt TM as a model of care.

This study was approved by Kassab Committee and was conducted in accordance with The Declaration of Helsinki. All participants gave informed consent prior to participation in the survey.

Subject inclusion criteria

Were included parents of patients aged between 0 and 16 years with established JIA, recruited from the rheumatology department of Kassab institute of orthopaedics. We also included children ≤ 16 years presenting with initial articular symptoms in whom the diagnosis was not established yet. Parents who didn't complete the entire questionnaire were excluded.

Statistical analyses

The data was transcribed using Excel and analyzed using the SPSS Statistics version 25 for.

Windows. The association of the preference for TM and various factors, specifically sociodemographic and economic data were examined using cross-tabulation and chi-square tests for categorical factors and using mean, SD, and *t*-tests for continuous measures. The differences were found to be significant for a coefficient of meaning $p < 0.05$.

Results

Forty parents were interviewed. Regarding the children, there was a female predominance with a sex-ratio of 0.6 (F:62.5%/M:37.5%). The majority of the patients (80%) had juvenile idiopathic arthritis. The demographic characteristics of the patients are presented in Table 1. Three respondents had a history of COVID-19 infection in the family. Only 22.5% of the parents were aware of the concept of TM and 32.5%

Table 1
Demographic characteristics of the respondents.

Monthly income (%)	
<500 dinars (<183 dollars)	27.5
500–1000 dinars (183 and 367 dollars)	55
>1000 dinars	17.5
The mean travel time to reach hospital (%)	
<2 h	60.5
2–5 h	26.3
>5 h	13.2
Electronic devices afforded in the house (%)	
Smartphone	17.5
Internet	22.5
Basic phones	12.5
All of the above	47.5

Table 2

The reasons and barriers to telemedicine according to juvenile idiopathic arthritis patients.

The main reasons for preferring telemedicine (%)	
Avoiding hospitals during pandemic	32.5
Cost saving	25
Time saving	27.5
Avoiding school absenteeism	27.5
The main reasons for preferring a live consultation (%)	
Discrepancy between physical and distant evaluation	47.5
The fear of the trivialization of the disease	38.5
Concerns over the ability to operate the technology	10
The fear of losing connectivity	12.5

of them would accept this model of care. The most preferred mean of telecommunication was video calls (82.5%) versus phone calls (17.5%). The reasons for preferring tele- or live-consultation are represented in Table 2.

Factors associated with telemedicine preference

There was no association between preference for TM and age, sex as well as the established diagnosis (Table 3). However, respondents who lived away from the hospital were less willing to adopt TM (7.7% TM vs 52% LC, $p = 0.012$). Similarly, there was an association between willingness to TM and familiarity with this concept as well as higher income ($p = 0.038$, $p = 0.004$ respectively). However, electronic devices afforded in the household did not seem an obstacle to TM ($p = 0.263$).

Discussion

The rapid changes forced by the COVID-19 pandemic have hampered the care of children with rheumatic diseases, especially patients with JIA (Badawy & Radovic, 2020). Within this context, we wanted to evaluate the willingness for TM among Tunisian parents as well as factors helping to adopt this alternative.

The results from this study suggest a low acceptability of TM (32.5%) in pediatric rheumatology. Initially, the role of TM in rheumatology was debated. However, the use of telehealth in pediatric care pre-COVID has increased in the past few years and has been dramatically accelerated by the pandemic (Williams et al., 2021). Indeed, TM use in the early pandemic, was very rare (1%), then it increased in number for each pediatric subspecialty and reached a fixed percentage of 30% (Williams et al., 2021). In the literature, the prevalence of TM across the globe ranges between 30% and 54% (Aydemir et al., 2021; Williams et al., 2021).

Barriers to telemedicine

In pediatric rheumatology, patients travel averagely 92 km compared with 40 km for patients in other pediatric subspecialties (Perdue et al., 2021). This highlights the lack of equitable distribution and the scarcity of pediatric rheumatologists (Perdue et al., 2021).

Table 3
Factors associated with telemedicine preference.

Factors	Telemedicine	Live consultation	p-value
Age at onset (years)	20.5	18	0.676
Age at diagnosis (years)	22	19	0.457
Gender (male %)	33	67	0.931
Diagnosis of JIA (%)	38	62	0.198
Lower income (%)	33	67	0.004
Travel time to reach hospital (>5 h) (%)	40	60	0.012
Family history of COVID-19 (%)	33	67	0.704
Electronic devices afforded (%)	31	69	0.263
Familiarity with TM (%)	67	33	0.038
The ability to operate the technology (%)	20	80	0.469

Nevertheless, patients would prefer live consultations. In our study, 39.5% of the children may need to spend >2 h for each hospital visit. Of them, 7.7% would prefer a televisit. Our results are in line with those of Bullock et al. Their study showed that the majority of patients in pediatric rheumatology would prefer in-person visits although 28% of them traveled >3 h to see their doctor (Bullock et al., 2017). Even though the experience of televisits among pediatric patients with chronic diseases was considered useful in 70% of the respondents, only 54% of them would prefer further tele-consultation (Aydemir et al., 2021). Another recent survey conducted across the 5 regions of Africa to identify the impact of COVID-19 on rheumatology practice showed that of the 554 rheumatologists, only 47% of them shifted to more virtual consultations (Akintayo et al., 2021). The most preferred mean of telecommunication was smartphone (60.5%), followed by WhatsApp (43.5%), and video call (9.6%) (Akintayo et al., 2021). In our study, the reluctance to adopt TM may be explained by the lack of available means of telecommunication. Indeed, 77.5% of the households were not having internet access at home and smartphones were available only in 17.5% of cases.

In our set of patients, the main reasons for preferring a live consultation were the fear of a possible discrepancy between physical and distant evaluation (47.5%) and the fear of the trivialization of the disease (38.5%). The respondents were less likely to think that the purpose of their visit could have been achieved over a video call. Marcin et al. revealed similar patient's concerns, including lack of physical examination (Marcin et al., 2004). Another study revealed concerns regarding the accuracy of virtual visits as only 40% of the diagnosis was made correctly through video-teleconferencing visits (Graham et al., 2000). However, the reliability of this data was hampered due to the small size and the old means of telecommunication used in the study (Piga et al., 2017).

In another study conducted on parents' children, desire to see a physician in person was cited by 63% as a reason against TM, although 35% of them reported concern about a physician's competence as a reason against surgical telemonitoring (Abdulhai et al., 2018).

Another barrier to the application of TM in pediatric rheumatology in Tunisia is the lack of an established legislation mainly regarding regulation, payment structures, and payment system issues (Haj Salem et al., 2020). However, given the particular context of the pandemic and the need for an alternative form of medical care, the authorities have chosen flexible laws to facilitate access to health care (Haj Salem et al., 2020). More importantly, there are no established guidelines for TM in pediatric rheumatology. Recently, Shenoi et al., provided a starting framework for TM use in pediatric rheumatology and described practical creative approaches (Shenoi et al., 2020). However, further work on its validation and acceptability is needed (Shenoi et al., 2020).

Advantages of telemedicine

Nearly 27.5% of our respondents found TM advantageous regarding the wasted time and especially the lack of absenteeism. In a study, 67% of parents' children agreed to telemedicine and telemonitoring as a way to be evaluated by a specialist (Abdulhai et al., 2018).

There are no arguable benefits of TM regarding cost saving and decreased waiting time (Akintayo et al., 2021; Aydemir et al., 2021; Bullock et al., 2017; Perdue et al., 2021; Williams et al., 2021). Nevertheless, one must keep in mind the cost behind the use of TM from purchasing electronic devices to internet and teleconsultation fees (Bashshur et al., 2020). In addition, the lack of physical contact was not considered a barrier by some authors. Indeed, the accuracy of video consultation achieved diagnostic agreement in 97% of cases compared with in-person visits (Leggett et al., 2001). Rezaian et al. also reported the successful use of TM in >4800 patients with rheumatic diseases monitored over 5 years by rheumatologists (Rezaian et al., 2020). Thus, to enhance the accuracy of tele-rheumatology consultation, qualified doctors should perform the physical examination (Shenoi et al., 2020). Recently, a virtual version of the pediatric gait, arms, leg, and spine (V-pGALS) is

being validated as part of a global TM initiative (Shenoi et al., 2020). Particularly, children with no established diagnosis in whom a more thorough physical examination is needed, may benefit from this tool (Gkrouzman et al., 2020). Among predictive factors of TM success, familiarity with the concept was associated with TM preference. Indeed, the patient was the most contributing factor in the perception of TM. This was also highlighted in many other studies (Aydemir et al., 2021; Gkrouzman et al., 2020; Piga et al., 2017). In the literature, familiarity with technology was a barrier to TM only in certain demographics particularly, in the elderly (Kong et al., 2021).

Practice implications

This is the first reported pediatric rheumatology experience of TM in Tunisia, and in North Africa in general. Thus, research findings and conclusions could be generalizable to other countries with similar socio-economic features. In addition, we carried out this survey as a preliminary theoretical step before the effective initiation of TM, to ascertain preferences of the targeted population. Another strength of this study is the established diagnosis in most of our patients, which enabled us to specifically assess the applicability of TM for this particular disease.

Limitations

Some limitations should be acknowledged and one of them is the limited number of respondents and the sample bias since only those who came to our department were surveyed. Another limitation concerns the evaluation of Tunisian doctor's perception of TM which was not investigated in this study. Another survey is being conducted on this subject at this time and results are in progress.

Conclusion

Our study highlighted the low prevalence of TM in pediatric rheumatology in Tunisia. The lack of physical examination and fear of trivializing the disease were the most reported barriers to TM. Only by recognizing limitations can we understand how to optimally improve the delivery of medical care.

Ethical approval

Ethical permission was granted from the ethical committee of Kassab Institute of Orthopaedics, Mannouba, Tunisia.

Human and animal guidelines

This study was conducted according to Helsinki Declaration for involving human subjects in the study.

Consent for publication

Written consent was obtained from the patients for this study.

Availability of data and materials

The data and supportive information is available within the article.

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Credit statement

1-MAKHLLOUF Yasmine: Corresponding author
Contribution: Data collection, conceptualization, editing, Final approval of the version of the article to be published.

2-Ben Nessib Dorra

Contribution: Data collection, conceptualization, Writing, material search.

3-FERJANI Hanene

Contribution: Substantial contributions to analysis and interpretation of data, Final approval of the version of the article to be published.

4-Triki Wafa

Contribution: Substantial contributions to analysis and interpretation of data, Final approval of the version of the article to be published.

5-MAATALLAH Kaouther

Contribution: Substantial contributions to analysis and interpretation of data, Final approval of the version of the article to be published

6-Dhia KAFFEL

Contribution: Substantial contributions to analysis and interpretation of data, Final approval of the version of the article to be published.

7-HAMD I Wafa

Contribution: Substantial contributions to analysis and interpretation of data, Final approval of the version of the article to be published.

Declaration of Competing Interest

All authors do not declare any conflicts of interest in this work.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pedn.2022.12.005>.

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