



Towards the evolution of the mHealth in mental health with youth: the cyber-space used in psychological rehabilitation is becoming wearable into a pocket

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Abstract: The study is focused into the field of tele-mental health with youth. It has three polarities. The first polarity consists on the analysis of the state of art of the guide-lines and reports the recent situation depicted by the American Telemedicine Association and the American Psychiatric Association. The second polarity faces the recent evolution related to the tools available in mHealth to activate remote psychological rehabilitation processes. These tools are today also based on a wearable cyberspace comprehending virtual (VR) and augmented reality (AR). The third polarity concludes the study by opening and submitting basic questions on the related activity of the stake-holders, scholars, regulation bodies and workgroups and showing some example of this activity.

Keywords: mHealth; smartphone; medical images

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Introduction

The recent article “*American Telemedicine Association Practice Guidelines for Telemental Health with Children and Adolescents*” by Myers *et al.* (1) represents a basic document, generated by an American Telemedicine Association (ATA) working group that provides a clinical guideline for the delivery of child and adolescent mental health and behavioral services. This article together with the successive article by Shore *et al.* “*Best Practices in Videoconferencing-Based Telemental Health April 2018*” (2) and together with a further group of articles and contributes (3-10) cited in (2), produced by working groups of the ATA and APA (American Psychiatric Association), represents in this field a complete kit of address resources for tele-mental applications (*Table 1*).

The guide (1) highlights also specifically as future developments (in the section Future directions in telemental health with youth) with regards to the eHealth and mHealth that telemental health “*in consideration to the need of the youth and family in the future should consider the integration with the social media, the asynchronous mental health, m-health,*

virtual technologies, virtual reality, augmented reality, intelligent wearable devices, and artificial intelligence—all to improve the quality and effectiveness of youth-centered care for all young people in need of mental healthcare services.”

The evolution of the mHealth in mental health with youth: between the forecast and the actual reality

The forecasts in the guide (1) detected in 2017 have perfectly made center with the scenario of evolution in this field and many aspects that in 2017 were futurist, now are reality. Today telemental health is particularly focused to the relationship between the youth and the smartphone both in relation to the attention to the new psychological pathologies and in relation to the new models of care that are oriented to navigate on the mHealth.

- (I) In details, with regards to the youth we generally are today assisting to: an increasing interest on mental health of young subjects: in particular, recently special attention is devoted to the relation

Table 1 The complete kit of resources by APA and ATA for telemental applications

APA	ATA
APA Web-based Telepsychiatry Toolkit [2016] (9)	Best Practices in Videoconferencing-Based Telemental Health [April 2018] (1)
Resource Document on Telepsychiatry and Related Technologies in Clinical Psychiatry, Council on Law and Psychiatry [2014] (10)	Practice Guidelines for Telemental Health with Children and Adolescents [2017] (2)
American Psychiatric Association. Telepsychiatry via Videoconferencing [1998] (11)	Telemental Health Resource Toolbox [2017]
	Delivering Online Video Based Mental Health Services [2014] (4)
	A Lexicon of Assessment and Outcome Measures for Telemental Health [2013] (3)
	Practice Guidelines for Video-Based Online Mental Health Service [2013] (6)
	Practice Guidelines for Videoconferencing Based Telemental Health [2009] (7)
	Evidence-Based Practice for Telemental Health [2009] (8)

APA, American Psychiatric Association; ATA, American Telemedicine Association.

with the new forms of addiction caused by the mobile-technologies.

- (II) The creation of Apps for an asynchronous by remote psychological *self therapy* based on virtual reality (VR) and augmented reality (AR) with and without exergames, App based on exergames.
- (III) The creation of Apps for the *self awareness* and empowerment for the correct use of the smartphone, as for example Apps that returns information on the time of use of different smartphone applications.
- (IV) An increasing interest to the design and assess models of care with a high technological content for providing psychological therapy to young subjects using the same technologies and /tools with whom they are familiar.

The connector of these issues is the Cyber Psychology (Cyb-Psy), which is evolving and adapting to navigate over the WWW more recently through the *m-health* and that now it is expanding its focus and field. As it is well known the Cyb-Psy, historically makes a large use of the *Cyberspace* (VR, AR) in psychological rehabilitation (12-14), by means also the use of large environments arranged with VR and AR tool-kits, named "*cave*" and very recently we are witnessing to the use of Apps with AR and VR contents in mobile-technology. Today the Cyb-Psy is also focusing to the psychological problems of the young people, the so called mobile-borns. These problems are due to the

interaction with the cybernetic systems, today mainly represented by the mobile-technologies. As it is recently emerged, the excessive use of smartphone Apps can lead to new forms of addiction, anxiety and depression (15,16) and/or to new disturbs identified with new curious definitions such as the *nomophobia*, the *ringxiety*, the *vamping* (17). The approach of the Cyb-Psy with the young subjects is currently integrating into the mobile-technologies by using the means indicated above, however this approach is showing useful also for other pre-existing pathologies and for a wide-spectrum of subjects (not only the young ones). *New figures are also emerging such as the cyber-psychologist or the augmented-psychologist.* Figure 1 shows the expansion of the Cyb-Psy: in particular: *the VR and AR are moving from a large cave into the inside of the smartphone: the cyberspace is becoming wearable into a pocket.*

The new components of care based on the cyber-psychology: the cyberspace and the SW-applications are becoming wearable into a pocket

What is happening is that today the psychological interventions are going to use more and more the mobile-technologies and based on a widened Cyb-therapy (Cyb-t), *de-facto* resting on to the following components:

- (I) Cyb-t1. Chat tools to connect with the therapists and also with other actors, such as the familiars.

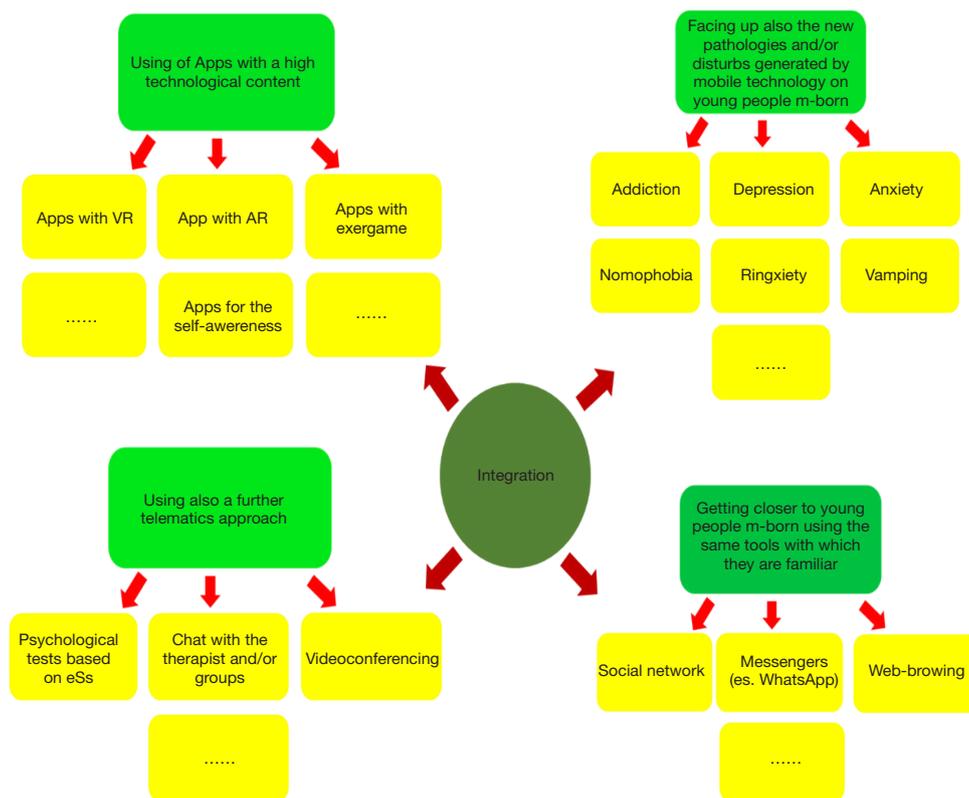


Figure 1 Expansion of the cyber-psychology in the mobile-technology.

- (II) Cyb-t2. Video-conferencing tools with a professional.
- (III) Cyb-t3. Integration of the therapy also with Apps with VR and/or AR contents for an asynchronous *self-therapy* (they are able to return indexes related to each trial to the remote therapist).
- (IV) Cyb-t4. Integration of the therapy with Apps for an asynchronous *self-awareness* aid to avoid an abuse of the time spent with the smartphone (they are able to return indexes related to an assessment of the time spent on the smartphone, useful to send to remote therapists).
- (V) Cyb-t5. Psychological tests based on electronic surveys (eS)s and provided onto the mobile-technologies.

There are recently available, for example software solutions that allow the remote eSs submissions (using for example the messengers, as for example WhatsApp) and the automatic data collecting into a cloud through a client-server architecture.

While Cyb-t1 and Cyb-t2 are typical of a tele-mental

approach Cyb-t3, Cyb-t4 and Cyb-t5 are very recent and are representing a novelty. The reader alone can try to activate, for example, researches on the WEB and to realize as very recently, in about two years, the offers of solutions for Cyb-t3 and Cyb-t4 (alone or integrated with the traditional components Cyb-t1 and Cyb-t2) are exploded. Several are, when focusing to Cyb-t3, examples of companies wide-spreading new Apps products for tele-mental applications over the mobile-health based on a *wearable into a pocket cyberspace*, as for not exhaustive examples the ones (casually chosen) reported in (18-22). Also big companies are moving in this field, at the moment of the writing of this piece, for example, *Google*[®] is releasing a version of *google map*[®] with the AR embedded: *think the usefulness for some mental disease such as the Alzheimer disease!* As a not exhaustive example of Apps for Cyb-t4 we can consider *QualityTime - My Digital Diet* (23) available in the Google play store that allows a correct and aware smartphone use, monitoring the time, inserting alerts, extracting reports you can exchange with the therapist. On the other hand, regarding Cyb-t5, it has become very easy to develop tests through eSs. For example using Form

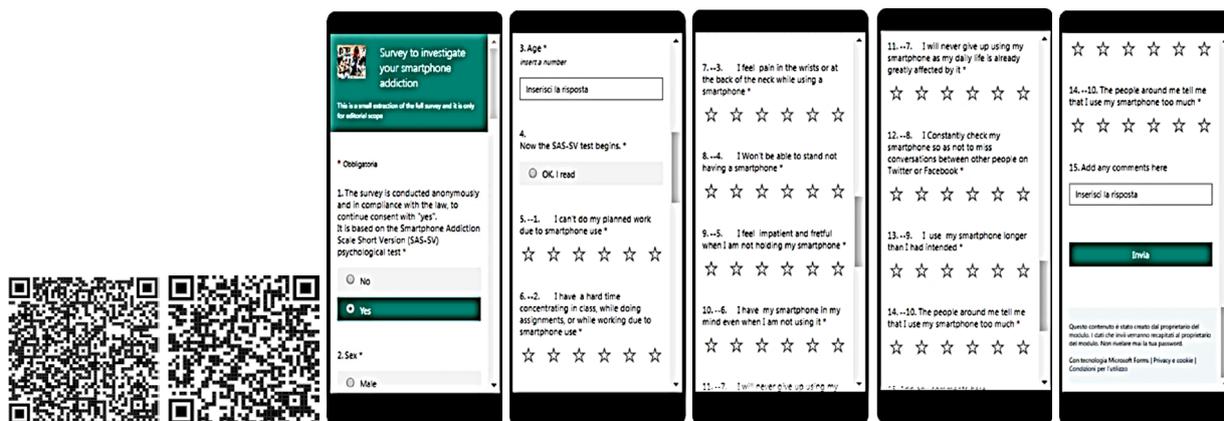


Figure 2 The eS: the QR codes of the eS and of the report; the print screens of the eS (PLEASE TRY the eS).

(Microsoft, USA) it is possible to make a simple eS and diffuse it through for example WhatsApp, obtaining an electronic report automatically. For example it is possible to convert into an electronic version a test used on adolescents and young adults to assess the smartphone addiction “the smartphone addiction scale short version” (SAS-SV) (17,23). *Figure 2* shows: the QR code that the reader can directly try and (b) the print screens of how the eS appears in the device. Link of the eS: <https://forms.office.com/Pages/ResponsePage.aspx?id=DQSIkWsW0yxEjajBLZtrQAAAAAUAOUXdFhURVpWTVhFTDBRUEFOUFYzSIVXWEsyWjJaMC4u>; link of the eS report: <https://forms.office.com/Pages/AnalysisPage.aspx?id=DQSIkWsW0yxEjajBLZtrQAAAAAUAOUXdFhURVpWTVhFTDBRUEFOUFYzSIVXWEsyWjJaMC4u&AnalyzerToken=iqzeoLQAAhfjC7uGHEYtfxTxaSdhoPS>.

How to face these evolutions: the questions to the international scholars, stakeholders, regulation bodies and work groups

The evolution in this field of mHealth, as it has been highlighted, is quit rapid and it is strongly hooked to the technology innovation: what it is futurist become reality in a couple of years! In particular we are here assisting to the integration of new components of care in mobile-health based on Cyb-Psy. It is particularly evident the mutation if we consider that the Cyberspace used in Cyb-t is migrating from the large environments of the cave directly into the smartphone becoming a Cyberspace wearable into a pocket. The citizen must be helped with clarification initiatives to avoid to lost her or him into the Apps that rapidly is going

to grow (24) in number also in some field of tele-mental health (25).

The opinion and voice of professionals’ actors is surely basic in this field. The role of the mHealth will be essential starting from the research up to the standardization/regulation initiatives.

Certainly the scholars, the stake-holders, regulation bodies and workgroups from the scientific societies will be called to (I) answer to key-questions on the prevention of the new pathologies and disturbs from smartphone abuse (15-17,23), using the same means of the mobile-technologies to provide solutions based on mobile-health; (II) to develop solutions for the design, modelling, assessment and regulation in this field.

An important point in the prevention will be surely to design initiatives, also based on (III) e-learning processes particularly dedicated to young people. Surely will be also necessary to apply properly scientific tools, provided by the research as, for example, the exercises of scientific positioning. Useful will be, therefore, to activate before all, (IV) wide range initiatives of positioning based on the exercises of scientific positioning that could involve all the actors, to fix a first preliminary map-point from which to starts.

It is very probable that many are moving in the directions (I-IV) and that therefore we will see scientific disseminations of guidelines and/or other policy documents very soon.

APA for example, at the moment of the writing of this contribution is announcing that will be forming an Expert Panel for its forthcoming resource, APA App Advisor, based on its App Evaluation Model (26), an important action in

this direction that shows great attention to the phenomenon highlighted here.

At the moment at the Istituto Superiore di Sanità, the Italian National Institute of Health we have developed training initiatives, focused to young adolescents in the secondary schools also focused to the prevention on mental health [see PS01 on the web links (27,28)] and currently we are developing a wide-range *positioning exercise* using dedicated eSs that we are currently submitting to actors (citizens and professionals) in this field.

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Footnote

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