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An international expert survey on the worldwide digitalization in psychiatry: Global findings from the WPA survey

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ABSTRACT

Background: The World Psychiatric Association (WPA) Working Group on Digital Psychiatry aims to digitally supplement, support and improve mental health and care literacy, acceptance and accessibility across WPA member countries and National Psychiatric Associations (NPAs). To help with this goal, the present study was set to explore first the global status of digital mental health and care across NPAs

Methods: An international expert survey on the digitalization level across all 145 WPA NPAs was electronically distributed through Qualtrics. Descriptive statistics were carried out on the global dataset.

Results: Across all 145 responses, 57 were included for analysis (39.3 % response rate). Most NPAs reported lacking an official section on digital mental health (73.7 %), missing national (59.6 %) or regional policies (82.5 %), clinical guidelines (>60 % depending on the digital tool/program), and education/training in both medicine (77.2 %) either and psychiatry training programs (71.9 %). Telemedicine seemed to be the most regulated digital tool in more than half of all included NPAs. Telemedicine (45.6 %) and telemental healthcare (38.6 %) were generally reimbursed. The reported highest priority areas for future actions across WPA Regions were education and training, and the development of guidelines.

Conclusion: This study represents a benchmark in the work of the WG on Digital Psychiatry. It presents clear priority areas that will guide the delivery of targeted actions aimed to promote digital mental health and care, and ultimately, equitable mental health outcomes around the world. Overall, the highest priorities to be globally implemented are represented by education/training and evidence-based clinical practice guidelines.

1. Introduction

The World Psychiatric Association (WPA) Working Group (WG) on Digital Psychiatry, appointed in 2020 (Javed, 2020), aims to contribute to support and improve digital mental health and care around the world (Ramalho et al., 2023). These objectives are in line with the WG's interest in fulfilling WPA Activities' Report 2020–2023 (Ramalho et al., 2023) and its Position Statement, shared and approved at the 23rd WPA Congress of Psychiatry in Austria (Ramalho et al., 2023). The WG is actively involved in activities to improve evidence, data acquisition, policy development and dissemination (Gaebel et al., 2020, Gaebel et al., 2021, Kalman et al., 2023, Ramalho et al., 2020a), education/training (Chacko et al., 2022, Naskar et al., 2022, Orsolini et al., 2021a, Orsolini et al., 2022a, Orsolini et al., 2022b), evidence-based guidelines and recommendations (Chen et al., 2023, Gaebel et al., 2016, Gaebel et al., 2017, Gürcan et al., 2024, Orsolini et al., 2021b, Orsolini et al., 2024, Rahman et al., 2022, Raj et al., 2022, Ramalho et al., 2020b, Ruiz-Cosignani et al., 2024, Tahir et al., 2021), and the implementation of digital mental health and care globally, personalizing priority needs and steps across WPA regions (Ramalho et al., 2023, Volpe et al., 2023). These activities are in the context of the recently updated WPA Action Plan for the Triennium 2023–2026 (Ramalho et al., 2023), which underscored the WPA's commitment to improve global mental health and care by facilitating the transformation

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of mental health systems.

To help support the recently updated WPA Action Plan, the WG designed a web-based survey to assess the extent to which digital mental health tools and practices had been adopted across the four WPA regions (Region 1: Americas; Region 2: Europe; Region 3: Africa, Middle East and Central and Western Asia; Region 4: Asia and Australasia), as well as to identify needs and gaps. Based upon the main findings coming from the survey, the WG aims to create a comprehensive map of digital mental health resources and needs, providing a foundation for future WPA-led initiatives aimed at reducing the digital mental health gap across the globe.

2. Materials and methods

2.1. Study design

An online survey was first developed *ad hoc* by the WG leading team [redacted for review]and shared with members of the sub-group "Baseline surveillance on digital mental health and care" for feedback and comments, incorporated by the leading team. The survey was developed using the Qualtrics platform (www.qualtrics.com), and it covered questions on digitalization in general health and mental health care, focusing on the status and use of various digital tools and programs used in mental health and care (e.g., telemental health and care, digital therapeutics, mobile health care, digital health records, digital integrated platforms for mental health care) and other areas, consisting in a final total of 10 sections (see ***Supplementary File***).

2.2. Procedure

With the support of the WPA President Prof. Afzal Javed, the Geneva Secretariat and the 18 Zonal Representatives, the survey was sent out via email to all 145 WPA NPAs members. Data collection took place from October 2022 to August 2023. NPA representatives received up to 2 reminders. As explained on the email and first page of the survey, participation was voluntary and only proceeded once potential participants provided electronic informed consent. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and according to the CHERRIES guidelines (Eysenbach, 2004) and guidelines for Good Clinical Practice (GCP) (WHO, 2016), following the approval by the WPA Executive Committee.

2.3. Statistical analyses

Statistical analyses were carried out by using the *Software Statistical Package for Social Sciences* (SPSS) for *MacOS* (version 26.0, IBM Corp., Armonk NY). All categorical variables were summarized as absolute frequencies (n) and percentages (%), while all continuous variables were summarized as means (m) and standard deviations (SD) or median (M) and 95 % Confidence Interval (CI), based on the normal or non normal distribution. The normality of quantitative variables was verified by using the Kolmogorov-Smirnov test and checking for kurtosis and skewness values. Descriptive analyses were carried out on the global dataset, following the thematic areas investigated by the survey (i.e., the level of digitalization in general health and mental health; the level of availability and usage of digital tools and programs in general and mental healthcare; the presence/extent of specific national/regional policies, regulations and/or guidelines for the use of digital tools and programs; the extent of education and training programs in the field of digital mental health and care; and, the suggested country-based priorities in implementing digital mental health and care). The significance level was set a priori at $p \leq 0.05$, and all hypotheses were two-tailed.

3. Results

3.1. Overview of participating NPAs

From a total sample of 145 contacted WPA NPAs member societies in all 4 WPA regions, 89 responses were collected (61.4 %), of which 33 were excluded because of incomplete or duplicate forms (see Fig. 1). As a result, 57 (39.3 %) responses were included in the final analysis. In one-third of participating NPAs (N = 19; 33.3 %), the data provided were not officially approved by their respective NPAs. Participating NPAs were mainly represented by countries belonging to the WPA Region 2 (Europe) (N = 27; 47.4 %) (Table 1**;** Fig. 2). Most NPAs (N = 42; 73.7 %) reported not having a section and/or committee on digital mental health or related topics (Table 1).

3.2. Digitalization in general healthcare

The most commonly reported available digital features in general healthcare were digital medical record (N = 52; 92.9 %), digital personal health record (N = 43; 76.8 %), patient portal (N = 43; 76.8 %), and digital prescription (N = 43; 76.8 %). Similarly, the most commonly reported used features were digital medical records (N = 50; 90.9 %), digital personal health records (N = 42; 79.2 %), digital prescriptions (N = 40; 76.9 %), and patient portals (N = 40; 74.1 %) (Table 2).

3.3. Availability and usage of digital tools and programs in general and mental healthcare

Most NPAs reported that mobile apps (N = 50; 87.7 %) and telehealth (N = 48; 84.2 %) were the most often available digital tools and programs in general healthcare. Serious digital games were reported amongst the least available tool (N = 16; 29.1 %), followed by virtual/augmented reality-based interventions (N = 22; 40 %) and chatbots (N = 24; 42.9 %) (Table 3a). Mobile apps (N = 45; 78.9 %) and telemental health care (N = 43; 75.4 %) were also the most often reported available digital tools and programs in mental healthcare. In mental healthcare, serious digital games (N = 13; 24.1 %) and chatbots (N = 18; 32.1 %) were also the least often reported as available.

NPAs were also asked to report the approximate usage level of digital tools and programs using a 6-point Likert scale. Despite their highly reported availability, the reported average median level of usage of both telemental health care (95 %CI = 2.9–3.7) and mobile apps (95 %CI = 2.4–3.1) in mental health care systems was 3.0 (Table 3a). NPAs were also asked to report the approximate level of usage of digital tools and programs in various areas of mental health and care using a similar 6-point Likert scale. The average median level of the reported use in mental health promotion was 3.4 (95 %CI = 3.1–3.8) and on mental illness prevention and treatment was 3.0 (respectively, 95 %CI = 2.5–3.2 and 95 %CI = 2.4–3.1). The average level of usage was lower for other areas, e.g., early recognition of mental illness (median = 2.0; 95 % CI = 1.7–2.3) and diagnosis in mental health (median =2.0; 95 %CI = 2.1–2.8) (Table 3b).

3.4. Policies and regulations

Most NPAs reported the absence of a national policy for the use of digital tools and programs in mental health and care (N = 34; 59.6 %). The WPA Region 2 (Europe) was the region with the most number of NPAs reporting the presence of a national policy (N = 10; 43.5 %), followed by the WPA Region 4 (Asia and Australasia) (N = 9; 39.1 %) (Table 4). Similarly, most NPAs reported lacking regional policies for the use of digital tools and programs in mental health and care (N = 47; 82.5 %), with the WPA Region 2 (N = 4; 40 %) and WPA Region 4 (N = 4; 40 %) having the most number of NPAs reporting the presence of regional policies (Table 4).

Most NPAs reported country-based regulations on quality criteria

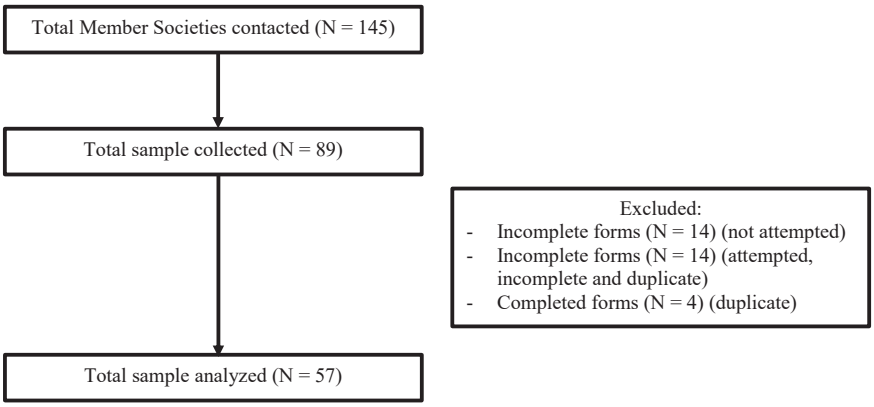

Fig. 1. Flowchart of data collection and analysis.

required, on one hand, for the development, and on the other hand, the usage of digital tools and programs, only for telemedicine (52.6 % and 57.9 %, respectively), followed by telemental healthcare (45.6 % and 52.6 %, respectively) (Table 5). The survey also asked NPAs about regulations on quality criteria for the qualification required for clinicians to provide digital tools and programs in mental health and care settings, and similarly, most NPAs reported regulations mainly for telemedicine and telemental health (45.6 % for both) (Table 5).

3.5. Guidelines for digital tools and programs

Most NPAs reported no availability of country-based and/or NPA-based clinical guidelines for the application of digital tools and programs, e.g., mobile apps (N = 50; 87.7 %), telemedicine (N = 35; 61.4 %), and telemental healthcare (N = 39; 68.4 %) (Table 6). The survey also asked NPAs to report, using a 6-point Likert priority scale, areas in which they would like to see further development of practical guidelines. The highest prioritized were telemedicine (median = 6.0; 95 %CI = 4.2–5.2) and telemental health (median 6.0; 95 %CI = 4.4–5.3), and the lowest were wearables (median = 4.00; 95 %CI = 3.5–4.4) and serious digital games (median = 4.0; 95 %CI = 3.3–4.2) (Table 6).

3.6. Reimbursement regulations

Some, but not all, NPAs also reported that telemedicine (N = 26; 45.6 %) and telemental health care (N = 22; 38.6 %), while available and used, were reimbursed. Most others were generally not reported as reimbursed, despite their availability and usage (Table 7). Most NPAs also reported that reimbursement strategies were not currently under development in their respective countries (Table 7).

3.7. Education and training

The survey also asked NPAs to report on formal education and training related to digital mental health and care. Most NPAs reported that medical students (N = 44; 77.2 %), psychiatry trainees (N = 41; 71.9 %), and professionals accessing continuous medical education (N = 39; 68.4 %) usually do not receive this training. NPAs that reported formal training during medical training noted as a comment that it may be variable depending on medical courses and programs, and, in some cases, the training was under development or mainly consisted of training on telemedicine platforms and electronic medical reports. NPAs that reported the presence of formal training during psychiatric residency in their respective countries, also noted that it mainly consisted of training related to telepsychiatry, telemental health, electronic medical records, or e-prescriptions. Lastly, few NPAs also reported formal training during continuing professional development (CPD) programs, although noting that it mainly consisted of courses on the general use of digital health records or e-prescription or telepsychiatry.

3.8. Prioritized future areas

Finally, the survey asked NPAs to identify priority areas for further action in the field of digital mental health and care using a 6-point Likert scale. The highest median level of priority was reported for education and training of mental health professionals (median = 6.0; 95 %CI = 4.9–5.5) and the development of guidelines (for the delivery of digital mental health and care (median = 6.0; 95 %CI = 4.7–5.4), and on privacy and safety issues in e-mental health and care (median = 5.0; 95 % CI = 4.6–5.3)) (Fig. 3).

4. Discussion

To the best of our knowledge, this is the first global survey focused on digital mental health and care. In general healthcare, the most frequently available and also routinary used digital features in clinical practice included digital medical records, digital personal health records, digital prescriptions, digital patient portals and clinical data repositories in more than two-thirds of participating NPAs. Most frequently available digital tools and programs were represented by mobile apps and telehealth, both in general and mental healthcare; these were also the most commonly used in mental healthcare systems. The most commonly used areas of digital tools and programs in mental health care systems were represented by mental health promotion, prevention and treatment.

Most participating NPAs reported not having a dedicated section and/or committee focused on digital mental health and care. Amongst those who reported having such a section, most belonged to the WPA Region 4 - Asia and Australasia. Countries represented by these NPAs have a longer history of implementation of integrated digital and clinical mental health care (LaMonica et al., 2020, LaMonica et al., 2022, Mahoney et al., 2021). When present, such a section and/or committee tended to be mainly focused on telepsychiatry. Our findings are indicative of a global slowdown in the implementation of digital mental health and care, despite the acceleration determined by the COVID-19 pandemic (Insel, 2022, Pereira-Sanchez et al., 2020, Taylor et al., 2020, Torous et al., 2020, Wind et al., 2020). These findings are in line with a report by the World Health Organization (WHO, 2016), that reported telepsychiatry programs available in about one-third of all responding countries. A similar trend was also described in previous studies (Barnett et al., 2024, Greenhalgh and Wherton, 2022, Rojnic Kuzman et al., 2021) and by the European Psychiatry Association (EPA) Task Force on National Psychiatric Associations Council (Kalman et al., 2023).

In mental healthcare, most participating NPAs reported the lack of

Table 1
Geographical representation of participating WPA regions, zones, countries and NPAs.

WPA Region (N, %)	Zone (N, %)	Countries	Name of the NPA	Official section on DP*
Region 1 Americans (N = 11; 19.3 %)	Zone 1 (N = 0/1, 0 %) *Canada*	N.A.	N.A.	
	Zone 2 (N = 1/1; 1.8 %) *United States of America*	United States of America	American Psychiatric Association	x
	Zone 3 (N = 6/13; 10.5 %) *Mexico, Central America and the Caribbean*	Costa Rica	Costa Rican Psychiatric Association	
		Domenica Republic	Dominican Society of Psychiatry	
		Guatemala	Guatemalan Psychiatric Association	
		Honduras	Honduran Society of Psychiatry	
		Mexico	Mexican Psychiatric Association	
		Mexico	Mexican Society of Neurology and Psychiatry	
	Zone 4 (N = 1/4; 1.8 %) *South America – Northern Zone*	Peru	Peruvian Psychiatric Association	
	Zone 5 (N = 3/10; 5.3 %) *South America – Southern Zone*	Argentina	Argentinean Association of Psychiatrists	x
		Bolivia	Bolivian Society of Psychiatry	
		Uruguay	Society of Psychiatry of Uruguay	
Region 2 Europe (N = 27; 47.4 %)	Zone 6 (N = 4/15; 7.0 %) *Western Europe*	Austria	Austrian Association for Psychiatry and Psychotherapy and Psychosomatics	
		France	French Association of Psychiatry	
		Germany	German Association for Psychiatry, Psychotherapy and Psychosomatics	x
		United Kingdom	The Royal College of Psychiatrists (UK)	x
	Zone 7 (N = 7/8; 12.3 %) *Northern Europe*	Denmark	Danish Psychiatric Association	x
		Estonia	Estonian Psychiatric Association	
		Finland	Finnish Psychiatric Association	
		Latvia	Latvian Psychiatric Association	
		Lithuania	Lithuanian Psychiatric Association	
		Norway	Norwegian Psychiatric Association	
		Sweden	Swedish Psychiatric Association	
	Zone 8 (N = 4/13; 7.0 %) *Southern Europe*	Albania	Albanian Psychiatric Association	
		Greece	Hellenic Psychiatric Association	x
		Portugal	Portuguese Society of Psychiatry and Mental Health	
		Spain	Spanish Association of Neuropsychiatry	
	Zone 9 (N = 6/18; 10.5 %) *Central Europe*	Bosnia and Herzegovina	Psychiatric Association of Bosnia-Herzegovina	
		Croatia	Croatian Psychiatric Association	
		Hungary	Hungarian Psychiatric Association	
		Republic of Moldavia	Society of Psychiatrists, Neurologists, Psychotherapists and Clinical Psychologists of the Republic of Moldova	
		Serbia	Serbian Psychiatric Association	
		Slovakia	Slovak Psychiatric Association	
	Zone 10 (N = 6/10; 10.5 %) *Eastern Europe*	Belarus	Belarusian Psychiatric Association	
		Kazakhstan	The Association of specialists working in the field of mental health of the Republic of Kazakhstan	x
		Kirgizstan	Kyrgyz Psychiatric Association	
		Russian Federation	Russian Society of Psychiatrists	
		Russian Federation	Independent Psychiatric Association of Russia	
		Uzbekistan	Uzbekistan Psychiatric Association	x
Region 3 Africa & Middle East (N = 9; 15.8 %)	Zone 11 (N = 2/6; 3.5 %) *Northern Africa*	Egypt	Egyptian Psychiatric Association	x
		Tunisia	Tunisian Society of Psychiatry	
	Zone 12 (N = 3/13; 5.3 %) *Middle East and Central and Western Asia*	Afghanistan	Afghanistan National Psychiatry Association	
		Iraq	Iraqi Psychiatric Association	
		Saudi Arabia	Saudi Psychiatric Association	
	Zone 13 (N = 3/4; 5.3 %) *Central and Western Africa*	Democratic Republic of the Congo	Congolese Society of Mental Health	
		Nigeria	Association of Psychiatrists in Nigeria	
		Senegal	Society of Psychopathology and Mental Hygiene of Dakar	
	Zone 14 (N = 1/10; 1.8 %) *Eastern and Southern Africa*	Uganda	Uganda Psychiatric Association	
Region 4 Asia &	Zone 15 (N = 3/6;	India	Indian Psychiatric Society	x

(*continued on next page*)

Table 1 (*continued*)

WPA Region (N, %)	Zone (N, %)	Countries	Name of the NPA	Official section on DP*
Australasia (N = 10; 17.5 %)	5.3 %) *South Asia*	Afghanistan	South Asian Association for Regional Cooperation (SAARC) Psychiatric Federation	x
		Bangladesh		
		Bhutan		
		India		
		Maldives		
		Nepal		
		Pakistan		
		Sri Lanka		
		Myanmar	Myanmar Mental Health Society	
	Zone 16 (N = 3/5; 5.3 %) *South East Asia*	Indonesia	Indonesian Psychiatric Association	
		Philippines	Philippine Psychiatric Association	
		Thailand	The Psychiatric Association of Thailand	
	Zone 17 (N = 3/7; 5.3 %) *Eastern Asia*	China	Chinese Society of Psychiatry	x
		Japan	The Japanese Society of Psychiatry and Neurology	x
		South Korea	Korean Neuropsychiatric Association	x
	Zone 18 (N = 1/2; 1.8 %) *Australia, New Zealand and the South Pacific*	Australia and New Zealand	The Royal Australian and New Zealand College of Psychiatrists (RANZCP)	x

N: absolute number; %: percentage; N.A.: not available; NPA: National Psychiatric Association; DP: Digitalization in Psychiatry.

national and/or regional policies for the use of digital tools and programs in mental health and care, except for some exceptions belonging to the WPA Region 4, coherently with previously discussed findings (LaMonica et al., 2020, LaMonica et al., 2022, Mahoney et al., 2021). This trend has slightly increased globally compared to a previous WHO report (WHO, 2016), even though it is still lower than what was anticipated in the post-COVID-19 pandemic (Gaebel and Stricker, 2020). The European Psychiatric Association (EPA) report (Kalman et al., 2023) also reported an overall poor or fair presence of legislative and financial regulations and policies for telepsychiatry at a European level, despite a good to excellent increased accessibility and technical suitability among interviewed psychiatrists. Similarly, the e-Mental Health Innovation and Transnational Implementation Platform North-West Europe (eMEN) project, although carried out in 8 countries (i.e., Belgium, France, Germany, Ireland, The Netherlands, and the UK) all belonging to the WPA Region 2 reported extremely variable and different stages of implementing e-Mental health into mental healthcare (Gaebel et al., 2020, Gaebel et al., 2021). Hence, the panorama is extremely variable across countries and regions, and within countries.

Regarding the presence of dedicated country-based regulations on quality criteria required for the development and/or for the practical and routine use of digital tools and programs in mental health and care settings, and/or for the qualification required to clinicians, only telemedicine and telemental health seemed to be the most regulated worldwide. Potential limiting factors contributing to the implementation of digital mental health and care worldwide, as already suggested in a WHO survey (WHO, 2016), may include a lack of infrastructure (equipment and/or connectivity) and competing health systems priorities, as well as this lack of national and international legislations and/or regulations covering digital mental health programs. These findings are also suggested by the EPA report (Kalman et al., 2023). Reimbursement regulations are overly absent in most participating NPAs, and where present, they are usually provided for telemedicine and telemental healthcare.

Table 2
Digitalization in General Healthcare.

Digital Features	Availability, yes, %*	Usage, yes, %*
Digital Medical Records	92.9 %	90.9 %
Digital Personal Health Records	76.8 %	79.2 %
Patient Portals	76.8 %	74.1 %
Digital Prescriptions	76.8 %	76.9 %
Clinical Data Repositories	67.9 %	67.9 %
Digital Treatment Monitoring	51.8 %	54 %
Digital Therapies	58.9 %	56 %

N: absolute number; %: percentage; *Replies were not mandatory; hence, the percentage refers to the total who filled out the question.

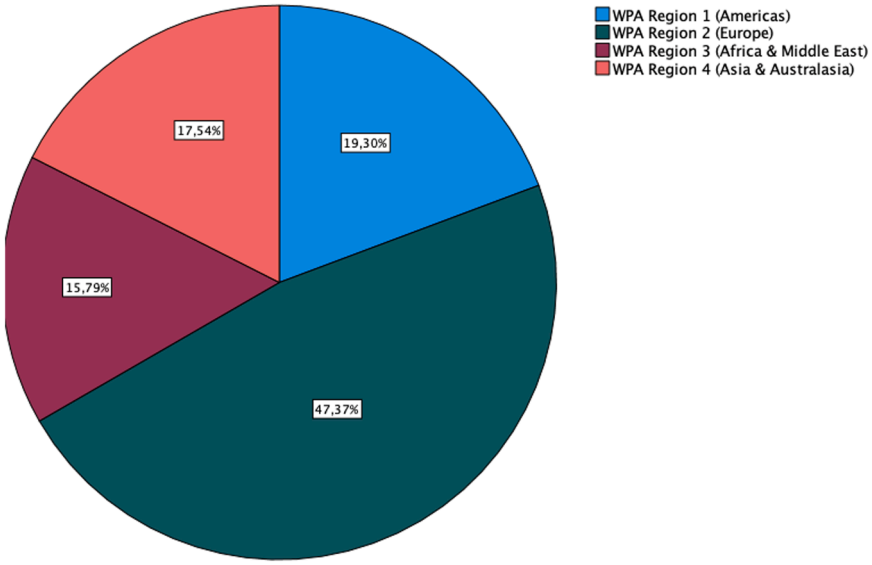

Fig. 2. WPA Regional representation of National Psychiatric Associations.

Table 3a
Digital Tools and programs in General and Mental Healthcare.

Digital Tools and Programmes	Availability, yes (%*)		Usage level in MH care system**
	GH	MH	
Telehealth	84.2%	75.4%	
Internet-based Interventions (guided)	56.1%	61.8%	
Internet-based Interventions (unguided)	51.8%	52.7%	
Internet-based Interventions (blended)	49.1%	49.1%	
Mobile apps	87.7%	78.9%	
Wearables*	60%	42.9%	
Serious Digital Games	29.1%	24.1%	
Virtual/Augmented Reality	40%	42.9%	
Chatbots	42.9%	32.1%	

N: absolute number; %: percentage; GH: General healthcare; MH: Mental healthcare.
*Replies were not mandatory; hence, the percentage refers to the total that filled out the question.
**based on median score of a 6-point Likert scale.

Table 3b
Type of Usage of Digital Tools and Programs in Mental Healthcare.

Type of usage	Usage level in MH care system*
MH Promotion	
MH Prevention	
MH Treatment	
MH Diagnosis	
MH Monitoring Treatment Response	
MH Early Intervention	
MH Relapse Prevention	
MH Rehabilitation	
MH Screening, Digital Phenotyping	
MH Early Recognition	

MH: Mental Health. *based on median score of a 6-point Likert scale.

Table 4
Policies on the use of Digital Tools and Programs in Mental Health and Care.

WPA Region	National policy, yes, N (%*)	Regional policy, yes, N (%*)
WPA Region 1	3 (27.3 %)	1 (9.1 %)
WPA Region 2	10 (37.0 %)	4 (14.8 %)
WPA Region 3	1 (11.1 %)	1 (11.1 %)
WPA Region 4	9 (90.0 %)	4 (40.0 %)
Total NPAs	23 (40.4 %)	10 (17.5 %)

N: absolute number; %: percentage
*Replies were not mandatory; hence, the percentage refers to the total who filled out the question.

National guidelines for the application of digital tools and programs were missing in more than two-thirds of all participating NPAs, except for some exceptions, particularly in WPA Regions 4 (Asia and Australasia) and 2 (Europe). Where present, dedicated guidelines uniquely addressed telemedicine/telepsychiatry and telemental healthcare, which are also suggested as areas to be prioritized and developed among those countries and NPAs without already available guidelines on digital mental health and care. Finally, most included NPAs reported that there is no formal training program on the use of digital tools and programs during medical training, psychiatric residency, or continuous medical education. However, the NPAs that reported having formal training, reported telepsychiatry as a main focus of this training. Our findings are also in line with previous studies which underlined the overall lack of dedicated training programs both in medicine and during psychiatric training on digital psychiatry (Dave et al., 2021, Hilty et al., 2018, Orsolini et al., 2021a, Orsolini et al., 2022b).

4.1. *Strengths and limitations*

The present study is not without limitations. Despite initially reaching a response rate of 61.4 %, around one-third of the collected sample did not fully complete the survey, which could be due to the large number of questions or the lack of information (both awareness

Table 5
Regulations on the use of Digital Tools and Programs in Mental Health and Care settings.

Digital Tools and Programs	Quality criteria for Digital Tools and Programs development	Quality criteria for Digital Tools and Programs usage	Quality criteria mental health professionals using Digital Tools and Programs
Telemedicine, yes, N (%)	30 (52.6 %)	33 (57.9 %)	26 (45.6 %)
Telemental health, yes, N (%)	26 (45.6 %)	30 (52.6 %)	26 (45.6 %)
Internet-based interventions, yes, N (%)	22 (38.6 %)	24 (42.1 %)	22 (38.6 %)
Mobile apps, yes, N (%)	17 (29.8 %)	18 (31.6 %)	11 (19.3 %)
Wearables, yes, N (%)	12 (21.1 %)	14 (24.6 %)	10 (17.5 %)
Serious Digital Games, yes, N (%)	13 (22.8 %)	13 (22.8 %)	10 (17.5 %)
Virtual/ Augmented Reality, yes, N (%)	14 (24.6 %)	15 (26.3 %)	11 (19.3 %)
Chatbots, yes, N (%)	10 (17.5 %)	13 (22.8 %)	10 (17.5 %)

N: absolute number; %: percentage

Table 6
Guidelines for Digital Tools and programs in Mental Healthcare.

Digital Tools and Programs	Availability, yes, N (%*)
Telemedicine	22 (38.6 %)
Telemental healthcare	18 (31.6 %)
Internet-based Interventions	11 (19.3 %)
Mobile apps	7 (12.3 %)
Wearables	2 (3.5 %)
Serious Digital Games	2 (3.5 %)
Virtual/Augmented Reality	3 (5.3 %)
Chatbots	3 (5.3 %)

N: absolute number; %: percentage.
*Replies were not mandatory; hence, the percentage refers to the total that filled out the question.

Table 7
Reimbursement Regulations of use of Digital Tools and Programs in Mental Health and Care settings.

Digital Tools and Programs	Availability, yes, N (%*)	Currently under development, yes, N (%*)
Telemedicine	26 (45.6 %)	8 (14.0 %)
Telemental health	22 (38.6 %)	9 (15.8 %)
Internet-based Interventions (guided)	8 (14.0 %)	7 (12.3 %)
Internet-based Interventions (unguided)	6 (10.5 %)	5 (8.8 %)
Internet-based Interventions (blended)	8 (14.0 %)	4 (7.0 %)
Mobile apps	6 (10.5 %)	5 (8.8 %)
Wearables	1 (1.8 %)	4 (7.0 %)
Serious Digital Games	1 (1.8 %)	2 (3.5 %)
Virtual/Augmented Reality	1 (1.8 %)	3 (5.3 %)
Chatbots	1 (1.8 %)	2 (3.5 %)

N: absolute number; %: percentage.
*Replies were not mandatory; hence, the percentage refers to the total that filled out the question.

and/or enough knowledge by respondents) to complete each section, potentially compounded by some very targeted questions for which some NPAs may not have had access to the necessary information to answer. However, this should be considered an interesting finding itself, as it may point to how digital mental health and care might still be a very '*niche*' topic in some countries.

There are, however, other limitations which should be adequately discussed and considered. All collected responses should be considered a reflection of the knowledge and opinion of the participants rather than the sum of perspectives from a representative sample of healthcare professionals in NPAs' respective countries. Furthermore, the survey did not collect information on the state-of-the-art of the current digitalization index and financial/economic dedicated resources dedicated to implement digital tools and programs, a potentially confounding variable could influence the generalizability of the findings, as not all WPA regions and countries share the same resources. Also, representativeness across WPA Regions varied, hence, the present findings could be potentially biased and not be fully representative of the global panorama of all WPA Regions. The poor response rate from some WPA Regions could be interpreted as a lack of awareness and/or knowledge on the topic rather than poor interest/engagement in the initiative, as the total reached sample of NPAs was initially of 61.4 %. In this regard, some NPAs suggested including a "I do not know" option answer, further underlining the potential bias represented by the general poor knowledge on the topic. Furthermore, around one-third of responses was reported as not approved by their respective NPAs. A further post-hoc analysis by actively and directly involving each participating NPA could help to better interpret data coming from each WPA region.

4.2. Implications of the findings for future practice, education and research

The digitalization of the mental health services and infrastructures may strengthen mental health care access, particularly in low- and middle-income countries (Bhugra et al., 2017, Pokharel et al., 2024, Tahir et al., 2021, Taylor et al., 2020, Torous et al., 2020, Torous et al., 2021). The present study offers a strong starting point for future in-depth comparative research across WPA regions that will help develop a targeted and tailored strategy plan by the WPA WG on Digital Psychiatry, to be co-developed alongside WPA Zonal Representatives and targeted NPAs. The findings show a shared set of identified priority areas across regions, that is, education and training of mental health professionals (Priority Target 1a) and theoretical and practical guidelines for the delivery of digital mental health and care by mental health professionals (Priority Target 1b) (Fig. 3).

Priority Target 1a should include education and training on digital treatment monitoring and therapies both in general and mental healthcare and on specific and advanced digital tools and programs in mental health such as internet-based interventions and wearables, both usually available but less frequently used. Education and training on other digital tools and programs should take into account their current availability, and adapt the training and education accordingly based on this level of accessibility.

Priority Target 1b involves the further development of WPA-supported practical guidelines in mental health care and systems for those digital tools and programs which appear to be less represented by already existing guidelines, such as internet-based interventions, mobile apps and chatbots. Similarly, guidelines on wearables, serious digital games and virtual/augmented realities should also preliminarily evaluate which is the current level of their availability, feasibility and financial sustainability, in order to adapt dedicated guidelines accordingly. These guidelines should also address key priority areas, which could represent separate chapters/sections for each digital tool-related guidelines, including early recognition, diagnosis, monitoring treatment response, and early intervention.

Other priority areas should not be overlooked. For example, NPAs

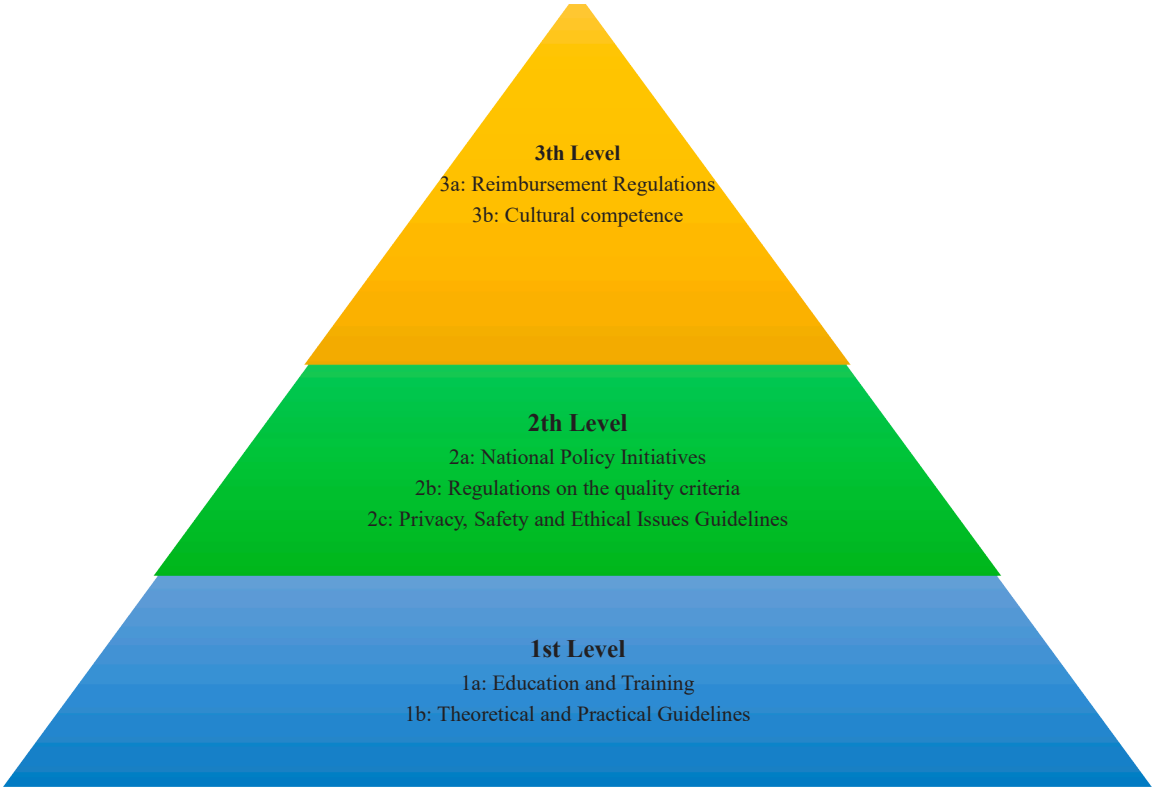

Fig. 3. Priority-level Target Plan for the WPA WG on Digitalization in Mental Health and Care.

should work together with the WG to promote further regulations and policies. Similarly, the WG could also provide supplementary guidelines for each target digital tool and program included in the priority target 1b, which should also discuss the cultural responsiveness of these tools and programs in each setting.

5. Conclusions

These findings provide a comprehensive overview of the global status quo regarding the availability, usage, regulations, policies, guidelines, education and training of digital mental health and care. They also inform the key priorities – education and training –to be implemented and developed by WPA WG on Digital Mental Health and Care at a global level, helping to develop targeted initiatives aimed to incentivize the digitalization process in mental health and psychiatry. The present study serves as an important benchmark for the WPA's ongoing efforts to bridge the digital mental health gap worldwide.

Author contributions

Gaebel W, Volpe U and Ramalho R designed and conducted the study; Orsolini L carried out the analysis; Ransing R contributed to the analysis; Orsolini L and Volpe U wrote the paper; Volpe U and Ramalho R provided advice and revisions to the drafts; and Gaebel W supervised the study.

CRediT authorship contribution statement

Laura Orsolini: Writing – original draft, Formal analysis. **Umberto Volpe:** Writing – review & editing, Writing – original draft, Investigation, Conceptualization. **Rodrigo Ramalho:** Writing – review & editing, Investigation, Conceptualization. **Ramdas Ransing:** Formal analysis. **Wolfgang Gaebel:** Writing – review & editing, Supervision, Investigation, Conceptualization.

Declaration of Competing Interest

All the authors report no relevant conflicts of interest for this article.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.ajp.2024.104340.

References

Barnett, L., Vara, A., Lawrence, M., Ma'u, E., Ramalho, R., Chen, Y., et al., 2024. The use of telepsychiatry during COVID-19 in Aotearoa New Zealand: experiences, learnings and cultural safety. J. Ment. Health Train. Educ. Pr. 19 (2), 86–95.

Bhugra, D., Tasman, A., Pathare, S., Priebe, S., Smith, S., Torous, J., et al., 2017. The WPA-lancet psychiatry commission on the future of psychiatry. Lancet Psychiatry 4 (10), 775–818.

Chacko, E., Vara, A., Cheung, G., Naskar, C., Ramalho, R., Bell, R., 2022. A mindfulness-based cognitive therapy informed virtual psychiatry trainee wellbeing programme: Development and preliminary feedback. Austral Psychiatry 30 (5), 663–667.

Chen, Y., Ramalho, R., Yue, B., Ning, B., Feng, K., Cheung, G., 2023. Exploring the benefits of telemental health care for Asian New Zealanders: a mixed methods study. J. Technol. Behav. Sci. 1–10.

Dave, S., Abraham, S., Ramkisson, R., Matheiken, S., Pillai, A.S., Reza, H., et al., 2021. Digital psychiatry and COVID-19: the Big Bang effect for the NHS? BJPsych Bull. 45 (5), 259–263. https://doi.org/10.1192/bjb.2020.114.

Eysenbach, G., 2004. Improving the quality of web surveys: the checklist for reporting results of internet E-surveys (CHERRIES). J. Med Internet Res 6 (3), e34. https://doi.org/10.2196/jmir.6.3.e34. Erratum in: [DOI: 10.2196/jmir.2042].

Gaebel, W., Großimlinghau, I., Kerst, A., Cohen, Y., Hinsche-Böckenholt, A., Johnson, B., et al., 2016. European Psychiatric Association (EPA) guidance on the quality of eMental health interventions in the treatment of psychotic disorders. Eur. Arch. Psychiatry Clin. Neurosci. 266 (2), 125–137.

Gaebel, W., Großimlinghaus, I., Mucic, D., Maercker, A., Zielasek, J., Kerst, A., 2017. EPA guidance on eMental health interventions in the treatment of posttraumatic stress disorder (PTSD). Eur. Psychiatry 41, 140–152. https://doi.org/10.1016/j.eurpsy.2017.01.001.

Gaebel, W., Lukies, R., Kerst, A., Stricker, J., Zielasek, J., Diekmann, S., et al., 2021. Upscaling e-mental health in Europe: a six-country qualitative analysis and policy recommendations from the eMEN project. Eur. Arch. Psychiatry Clin. Neurosci. 271, 1005–1016.

Gaebel, W., Stricker, J., 2020. E-mental health options in the COVID-19 pandemic and beyond. *Psychiatry* Clin. Neurosci. 74 (8), 441–442. https://doi.org/10.1111/pcn.13079.

Gaebel, W., Trost, N., Diekmann, S., Lukies, R., Zielasek, J., 2020. Transnational policy for eMental health. A guidance document for European policymakers and stakeholders. Dusseldorf/Cologne.

Greenhalgh, T., Wherton, J., 2022. Telepsychiatry: learning from the pandemic. Br. J. Psychiatry J. Ment. Sci. 220 (5), 257–261.

Gürcan, A., Pereira-Sanchez, V., Da Costa, M.P., Ransing, R., Ramalho, R., 2024. Artificial intelligence innovations in psychiatry: global perspective from early career psychiatrists. Turk. Psikiyatr. Derg. 35 (1), 83.

Hilty, D.M., Maheu, M.M., Drude, K.P., Hertlein, K.M., 2018. The need to implement and evaluate telehealth competency frameworks to ensure quality care across behavioral health professions. Acad. Psychiatry 42 (6), 818–824. https://doi.org/10.1007/s40596-018-0992-5.

Insel, T., 2022. Mental health care 2.0. Science 376 (6596), 899. https://doi.org/10.1126/science.add1020.

Javed, A., 2020. WPA Action Plan 2020–2023: a way forward. World Psychiatry 19 (3), 411–412. https://doi.org/10.1002/wps.20791.

Kalman, J.L., Burkhardt, G., Samochowiec, J., Gebhard, C., Dom, G., John, M., et al., 2023. Digitalising mental health care: practical recommendations from the European Psychiatric Association. Eur. Psychiatry 67 (1), e4. https://doi.org/10.1192/j.eurpsy.2023.2466.

LaMonica, H.M., Iorfino, F., Lee, G.Y., Piper, S., Occhipinti, J.A., Davenport, T.A., et al., 2022. Informing the future of integrated digital and clinical mental health care: synthesis of the outcomes from project synergy. JMIR Ment. Health 9 (3), e33060. https://doi.org/10.2196/33060.

LaMonica, H.M., Milton, A., Braunstein, K., Rowe, S.C., Ottavio, A., Jackson, T., et al., 2020. Technology-enabled solutions for Australian mental health services reform: impact evaluation. JMIR Form. Res 4 (11), e18759. https://doi.org/10.2196/18759.

Mahoney, A.E.J., Elders, A., Li, I., David, C., Haskelberg, H., Guiney, H., Millard, M., 2021. A tale of two countries: increased uptake of digital mental health services during the COVID-19 pandemic in Australia and New Zealand. Internet Inter. 25, 100439. https://doi.org/10.1016/j.invent.2021.100439.

Naskar, C., Cheung, G., Pinto da Costa, M., Ramalho, R., 2022. Online academic mentoring-Experiences from a virtual international exchange program for early career psychiatrists. Asian J. Psychiatr. 78, 103287-103287.

Orsolini, L., Appignanesi, C., Pompili, S., Volpe, U., 2022a. The role of digital tools in providing youth mental health: results from an international multi-center study. Int Rev. Psychiatry 34 (7-8), 809–826. https://doi.org/10.1080/09540261.2022.2118521.

Orsolini, L., Bellagamba, S., Marchetti, V., Menculini, G., Tempia Valenta, S., Salvi, V., Volpe, U., 2022b. A preliminary italian cross-sectional study on the level of digital psychiatry training, knowledge, beliefs and experiences among medical students, psychiatry trainees and professionals. Healthc. (Basel) 10 (2), 390. https://doi.org/10.3390/healthcare10020390.

Orsolini, L., Jatchavala, C., Noor, I.M., Ransing, R., Satake, Y., Shoib, S., et al., 2021a. Training and education in digital psychiatry: a perspective from Asia-Pacific region. Asia Pac. Psychiatry 13 (4), e12501. https://doi.org/10.1111/appy.12501.

Orsolini, L., Longo, G., Volpe, U., 2024. Practical application of digital therapeutics in people with mood disorders. Curr. Opin. Psychiatry 37 (1), 9–17. https://doi.org/10.1097/YCO.0000000000000906.

Orsolini, L., Pompili, S., Salvi, V., Volpe, U., 2021b. A systematic review on telemental health in youth mental health: focus on anxiety, depression and obsessive-compulsive disorder. Med. (Mex.) 57, 793. https://doi.org/10.3390/medicina57080793.

Pereira-Sanchez, V., Adiukwu, F., El Hayek, S., Bytyçi, D.G., Gonzalez-Diaz, J.M., Kundadak, G.K., et al., 2020. COVID-19 effect on mental health: patients and workforce. Lancet Psychiatry 7 (6), e29–e30. https://doi.org/10.1016/S2215-0366(20)30153-X.

Pokharel, A., Ramalho, R., Das, B.K., Rongmei, L., Jatchavala, C., Gürcan, A., Ransing, R., 2024. Technology-based interventions to reduce the treatment gap for common perinatal mental disorders in low-and middle-income countries (LMICs): challenges and the way forward. Indian J. Psychol. Med. 02537176231225649.

Rahman, J., Cheung, G., Lyndon, M.P., Lawrence, M., Ma'u, E., Chen, Y., Ramalho, R., 2022. Prioritising a culturally safe e-Mental Health research agenda in Aotearoa New Zealand: a sector survey report. Austral Psychiatry 30 (5), 619–623.

Raj, N.D., Ramdas, R., Rodrigo, R., 2022. A conceptual framework for the development of chatbots addressing COVID-19 vaccine hesitancy. IP Pavlov Russ. Med. Biol. Her. 30 (4), 575–580.

Ramalho, R., Adiukwu, F., Gashi Bytyçi, D., El Hayek, S., Gonzalez-Diaz, J.M., Larnaout, A., et al., 2020a. Telepsychiatry and healthcare access inequities during the COVID-19 pandemic. Asian J. Psychiatr. 53, 102234. https://doi.org/10.1016/j.ajp.2020.102234.

Ramalho, R., Adiukwu, F., Gashi Bytyçi, D., El Hayek, S., Gonzalez-Diaz, J.M., Larnaout, A., et al., 2020b. Telepsychiatry during the COVID-19 pandemic: development of a protocol for telemental health care. Front Psychiatry 11, 552450. https://doi.org/10.3389/fpsyt.2020.552450.

Ramalho, R., Volpe, U., Gaebel, W., 2023. WPA digitalization in mental health and care - empirical report on action plan and related activities. J. Technol. Behav. Sci. 9, 567–571. https://doi.org/10.1007/s41347-023-00352-z.

Rojnic Kuzman, M., Vahip, S., Fiorillo, A., Beezhold, J., Pinto da Costa, M., Skugarevsky, O., et al., 2021. Mental health services during the first wave of the COVID-19 pandemic in Europe: Results from the EPA Ambassadors Survey and implications for clinical practice. Eur. Psychiatry 64 (1), e41. https://doi.org/10.1192/j.eurpsy.2021.2215.

Ruiz-Cosignani, D., Chen, Y., Cheung, G., Lawrence, M., Lyndon, M.P., Ma'u, E., Ramalho, R., 2024. Adaptation models, barriers, and facilitators for cultural safety in telepsychiatry: a systematic scoping review. J. Telemed. Telecare 30 (3), 466–474.

Tahir, M.J., Waheed, S., Ullah, I., Ramalho, R., 2021. Telepsychiatry and mental healthcare referrals: recommendations for low-and middle-income countries. Perspect. Psychiatr. Care 57 (4), 2035. https://doi.org/10.1111/2Fppc.12732.

Taylor, C.B., Fitzsimmons-Craft, E.E., Graham, A.K., 2020. Digital technology can revolutionize mental health services delivery: the COVID-19 crisis as a catalyst for change. Int J. Eat. Disord. 53 (7), 1155–1157. https://doi.org/10.1002/eat.23300.

Torous, J., Bucci, S., Bell, I.H., Lars, V., Kessing, L.V., Faurholt-Jepsen, M., Whelan, P., et al., 2021. The growing field of digital psychiatry: current evidence and the future of apps, social media, chatbots, and virtual reality. World Psychiatry 20 (3), 318–335. https://doi.org/10.1002/wps.20883.

Torous, J., Jän Myrick, K., Rauseo-Ricupero, N., Firth, J., 2020. Digital mental health and COVID-19: using technology today to accelerate the curve on access and quality tomorrow. JMIR Ment. Health 7 (3), e18848. https://doi.org/10.2196/18848.

Volpe, U., Ramalho, R., Orsolini, L., Ransing, R., de Filippis, R., Gürcan, A., et al., 2023. An update from the WPA working group on digitalisation in mental health and care. World Psychiatry 22 (3), 494–495. https://doi.org/10.1002/wps.21143.

Wind, T., Rijkeboer, M., Andersson, G., Riper, H., 2020. The COVID-19 pandemic: The 'black swan' for mental health care and a turning point for e-health. Internet Interv., 100317 https://doi.org/10.1016/j.invent.2020.100317.

World Health Organization (WHO), 2016. Global diffusion of eHealth: making universal health coverage achievable. Report of the third global survey on eHealth. World Health Organization, Geneva.