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Awareness, Perceived Usefulness, and Prior Recommendation of Digital Therapeutic Applications Among Healthcare Professionals in Abu Dhabi, United Arab Emirates: A Cross-Sectional Survey

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Abstract

Background

Healthcare professionals influence the integration of digital therapeutic applications, yet evidence on their readiness in the United Arab Emirates (UAE) remains limited. This study assessed healthcare professionals' familiarity with, perceptions of, and willingness to adopt digital therapeutic applications in Abu Dhabi.

Methods

A cross-sectional, web-based survey was conducted in Abu Dhabi using a structured questionnaire adapted from a published instrument. Perception items used five-point response scales; high ratings were reported as the percentage selecting 4 or 5. After exclusions, 143 responses were analyzed using available case analysis. Associations between familiarity and professional characteristics were examined with the Fisher–Freeman–Halton exact and Pearson's chi-square tests, and an exploratory Fisher's exact test examined the association between perceived usefulness and prior recommendation.

Results

Of 143 respondents, 41.3% were familiar with the term "digital therapeutic applications," while 51.0% reported using general clinical applications often or very often and 37.8% had previously recommended such an application. Perceived usefulness was high, with 66.2% meeting an investigator-defined composite high-usefulness threshold. The most frequently reported barriers were limited patient technical ability (73.9%), data privacy (67.4%), absence of reimbursement (65.7%), and unclear legal liability (65.0%); training was the highest-rated explicit enabler and clinical evidence the highest-rated implementation expectation (81.8% each). Familiarity did not differ significantly by professional role ($p = 0.144$) or years of experience ($p = 0.452$), and there was no evidence of an association between high perceived usefulness and prior recommendation (odds ratio 0.79; 95% CI 0.39–1.62; $p = 0.585$).

Conclusions

At the sample level, frequent general application use and favorable usefulness ratings coexisted with lower familiarity and recommendation, describing an awareness–adoption disconnect rather than a sequential pathway. The findings suggest that favorable perceptions alone may be insufficient for adoption and identify training, evidence, guidance, and reimbursement as potential implementation priorities.

Introduction

Alongside conventional drugs and medical devices, software is increasingly being developed and evaluated as a therapeutic intervention. This shift sits within the broader field of digital health, which spans electronic health records, telemedicine, and mobile applications intended to improve the quality, safety, and efficiency of care [1, 2]. Within this field, prescription digital therapeutics (PDTs) have emerged as a distinct class of intervention. Digital therapeutics are software-based interventions intended to prevent, manage or treat medical conditions; PDTs constitute the subset made available under a prescription or equivalent professional authorization. Unlike general wellness or fitness applications, products that make therapeutic claims are generally subject to medical-device regulation and corresponding evidence requirements, although terminology and regulatory pathways vary across jurisdictions [3, 4]. Where these products meet the definition of Software as a Medical Device (SaMD), they fall within the applicable medical-device regulatory framework; requirements for clinical evidence and professional oversight vary by jurisdiction [4, 5]. Digital therapeutics have been developed and evaluated across several clinical areas, including substance use disorders, depression, anxiety, diabetes, hypertension and insomnia [4, 6]. By providing continuous, personalized care that can be used alone or alongside conventional treatment, PDTs may offer benefits to patients while reducing long-term costs and unnecessary clinic visits [7].

Whether these interventions reach routine practice depends substantially on healthcare professionals, who may recommend, prescribe where authorised, monitor and support their clinical use [4, 7]. Adoption, however, requires more than the availability of technology; it depends on professional readiness, including awareness, technical competence, and clinical confidence [8, 9]. Regulatory and reimbursement frameworks are evolving to support this. In the United States, qualifying software functions are regulated as medical devices, while Germany's DiGA pathway provides eligible digital health applications with a route to statutory reimbursement, subject to regulatory and evidence requirements [10–12]. Such structured pathways illustrate how reimbursement can support system-level integration. Even so, adoption remains uneven internationally, and regulatory approval alone does not guarantee integration into practice or clinician uptake [7].

Digital health has become a prominent component of health-system development in the UAE [1, 13]. This ambition is especially visible in Abu Dhabi, where the Department of Health has led major digital initiatives, most notably Malaffi, the region's first Health Information Exchange platform. Launched in 2019, Malaffi now connects more than 2,700 facilities and consolidates information from patients' consultations, laboratory tests and radiology images into secure longitudinal records [14]. Digital maturity has been associated with better performance in US hospitals, yet infrastructure alone does not ensure that new software interventions move into routine clinical workflows [15].

This tension motivates the present study. A potential disconnect—referred to here as the awareness–adoption paradox—may arise when general digital-health engagement and favourable perceptions of therapeutic software coexist with limited familiarity and low prior recommendation of digital therapeutic applications. These are separate population-level indicators rather than stages in a sequential adoption pathway. In this study, prior recommendation was treated as a behavioural proxy for adoption, whereas

implementation willingness represented adoption intention; neither measure verified prescribing or sustained clinical use. Although telemedicine differs from digital therapeutics, UAE research has reported a similar separation between awareness and use: a high proportion of the public reports awareness of telemedicine, while actual use is substantially lower, in part because of continued professional and patient reservations about the quality of digitally mediated care relative to in-person visits [16]. A high level of general digital readiness or perceived usefulness, in other words, does not automatically translate into clinical adoption. General health-application use should therefore not be equated with familiarity with or prior recommendation of digital therapeutic applications; the latter may be influenced by professional familiarity and implementation barriers. Because the questionnaire used the broader term “digital therapeutic applications,” this wording is retained when referring to the study measures; respondents’ answers should not be assumed to relate exclusively to regulated, prescription-only products.

Literature concerning PDTs and related digital-health interventions describes barriers to adoption at regulatory, professional, and patient levels. Systemic concerns include data privacy and patient confidentiality, together with uncertainty about legal liability should software malfunction or patient harm occur [17, 18]. Professional-level barriers include workflow disruption, administrative burden, limited confidence in clinical value, and inadequate digital skills or implementation support [19, 20]. Unclear reimbursement and insurance-coverage pathways represent further system-level obstacles to the integration of software-based treatments [7, 12]. At the patient level, limited technical ability or digital literacy in some populations may constrain implementation [21, 22]. Conversely, facilitators such as targeted professional training, the provision of objective patient data, and the establishment of national regulatory and evaluation procedures have been reported as potential facilitators of clinician adoption [7, 9].

To our knowledge, evidence concerning healthcare professionals’ readiness to adopt digital therapeutic applications in the UAE remains limited. Existing UAE research has focused primarily on broader technologies such as electronic health records, health-information exchange, AI and telemedicine rather than therapeutic software specifically [13, 16, 17, 20, 23]. The perspectives of physicians, nurses, pharmacists, and allied health professionals are central here, as their judgements about clinical validity and operational feasibility shape the sustainability of digital innovations in practice.

This cross-sectional study assessed healthcare professionals’ familiarity with, perceptions of, and willingness to adopt digital therapeutic applications in Abu Dhabi. It described general clinical-application use, prior recommendation, perceived usefulness, barriers, acceptance, and implementation expectations. The study also examined whether familiarity varied by professional role or years of experience and explored whether high perceived usefulness was associated with prior recommendation. Together, these analyses were used to characterise the potential awareness–adoption disconnect without assuming a sequential or causal pathway.

Materials and Methods

Study design

We conducted a quantitative, cross-sectional survey of healthcare professionals practising in Abu Dhabi, United Arab Emirates. A single-timepoint design was chosen because the study set out to describe the current state of awareness, perceptions, and willingness to adopt digital therapeutic applications across a professionally diverse workforce, rather than to track change over time. The survey was administered online and collected no identifying information.

Study population and sampling

Eligible participants were healthcare professionals—physicians, pharmacists, nurses, physiotherapists, and allied health professionals—working in public or private healthcare settings across Abu Dhabi, identified by self-reported profession. We recruited by convenience sampling, distributing the survey electronically to eligible professionals. This approach suited the exploratory aim and gave efficient access to a broad cross-section of professions, at the cost of a self-selected sample (addressed in the Limitations). Responses were collected between 31 March and 24 April 2026. No formal a priori sample-size calculation was performed; all eligible responses received during the study period were included.

Analytic population and missing data

A total of 147 responses were received. Three respondents declined the consent item and were excluded. One consented respondent reported business as their profession and was excluded because the response did not meet the prespecified healthcare-professional eligibility criterion. Following this exclusion, 143 consented responses remained in the primary analytic sample; professional licensure and practice location were not independently verified. Seven respondents did not report a profession; because a missing profession is not an occupational category, these responses were retained for all other analyses but excluded from the profession-specific test, which was therefore based on the 136 respondents with occupational data. For that test, health-related free-text entries (laboratory and social-work roles) were grouped with allied health professionals under a combined allied and other healthcare category. We used available-case analysis with no imputation: each variable was summarised using its own valid responses, and the denominator is reported wherever it fell below 143. As a sensitivity check, key descriptive findings were recomputed with all 144 consented responses included; the results were materially unchanged.

Instrument

Data were collected through a structured questionnaire administered in Google Forms. The questionnaire was developed for this study, drawing on domains and selected items from Biebl et al. [24] and adapting them to digital therapeutic applications and the UAE context. The questionnaire comprised seven sections: demographic and professional information; experience with digital health applications;

perceived usefulness of digital therapeutic applications; perceived risks and barriers; acceptance and willingness to use digital therapeutic applications; expectations toward digital therapeutic applications; and open-ended questions. Perception items were rated on a five-point scale (1–5); verbal endpoint labels (1 = strongly disagree; 5 = strongly agree) were displayed for the perceived-usefulness items, while the remaining items were presented as a numeric 1–5 scale. Endorsement of the latter items is reported as the percentage selecting 4 or 5. A short standardised description of digital therapeutic applications preceded the items so that respondents shared a common definition before answering.

The adapted questionnaire was reviewed by the research supervisors for relevance and clarity.

Ethical considerations

The study was performed in accordance with the Declaration of Helsinki. Participation was voluntary, and electronic informed consent was obtained before respondents could access the survey. Responses were anonymous, and no personally identifiable information was requested or recorded. Ethical approval was granted by the Research Ethics and Integrity Committee (REIC) of the Higher Colleges of Technology (approval reference REIC2026-CAP75; 7 May 2026).

Statistical analysis

Analyses were performed in Python (version 3.12) using pandas (version 3.0) and SciPy (version 1.17). Categorical variables were summarised as frequencies and percentages, and Likert-scale items as means with standard deviations; for perceived usefulness, barriers, and the acceptance and expectation items we also report the percentage of respondents selecting 4 or 5 on the scale. Internal consistency of the Likert subscales was assessed with Cronbach's alpha, computed on complete cases within each subscale.

Two demographic associations with familiarity were tested, each with a single global test and no post-hoc pairwise comparisons. For profession by familiarity (136 respondents with occupational data, in five professional groups), several expected cell counts were below five, so we used the Fisher–Freeman–Halton exact test rather than the chi-square approximation. For years of experience by familiarity, expected counts met the usual assumption and Pearson's chi-square test was applied. Effect sizes for both tables are reported as Cramér's V.

In an exploratory analysis, introduced after inspection of the primary results, we examined whether perceived usefulness and prior recommendation were related at the level of the individual respondent rather than only as separate marginal totals. The two were cross-tabulated and tested with Fisher's exact test, with the association summarised as an odds ratio with a 95% confidence interval. Perceived usefulness was operationalised as a composite of the five usefulness items: a respondent's mean across those items was computed where at least three were answered, and a mean of 4 or above—corresponding to average agreement across the subscale—was classified as high perceived usefulness.

Prior recommendation was the binary survey item (yes or no). This analysis included the 142 respondents with data on both measures.

Responses to the three open-ended items were reviewed descriptively to identify recurrent topics that complement the quantitative findings; they were not subjected to formal qualitative coding. The survey items measured familiarity with, and prior recommendation of, digital therapeutic applications rather than regulated prescription products specifically; prior recommendation was therefore treated as a behavioural proxy for adoption. Statistical significance was set at a two-sided alpha of 0.05.

Results

3.1. Sample characteristics

Of 147 responses received, three respondents declined consent and one reported a non-healthcare occupation, leaving 143 responses for analysis. The sample was predominantly female (110/143, 76.9%). Nurses formed the largest professional group (69/143, 48.3%), followed by physicians (21/143, 14.7%) and pharmacists (17/143, 11.9%); allied and other healthcare roles together accounted for a further 20 respondents (14.0%), and seven did not report a profession. Respondents spanned the full range of professional experience, from 0–5 years (59/143, 41.3%) to more than 20 years (33/143, 23.1%). Most respondents worked in government hospitals (91/143, 63.6%), followed by private practice (41/143, 28.7%) and blood banks (10/143, 7.0%); one respondent did not report a facility type. Full characteristics are given in Table 1.

Table 1
Characteristics of the study sample (N = 143).

Characteristic	n	%
Gender		
Female	110	76.9
Male	31	21.7
Prefer not to say	2	1.4
Profession		
Nurse	69	48.3
Physician	21	14.7
Pharmacist	17	11.9
Physiotherapist	9	6.3
Allied/other healthcare professional	20	14.0
Not reported	7	4.9
Years of professional experience		
0–5	59	41.3
6–10	21	14.7
11–20	30	21.0
More than 20	33	23.1
Healthcare facility		
Government hospital	91	63.6
Private practice	41	28.7
Blood bank	10	7.0
Not reported	1	0.7

Percentages are calculated on the full analytic sample (N = 143); where an item was not answered by all respondents, non-response is shown as a separate row.

 Combines respondents reporting allied health professional roles with free-text medical-laboratory and social-work roles.

3.2. Familiarity, clinical application use, and prior recommendation

Fifty-nine respondents (41.3%) reported familiarity with the term “digital therapeutic applications,” while 84 (58.7%) did not. General engagement with clinical applications was more common, with 73 respondents (51.0%) using mobile or tablet applications for clinical purposes often or very often and a further 41 (28.7%) doing so sometimes. Prior recommendation of a digital therapeutic application to a patient was reported by 54 respondents (37.8%). High perceived usefulness was observed in 94 of 142 respondents (66.2%). These measures capture distinct constructs rather than stages in a sequential pathway: frequent general clinical-application use (51.0%) and high perceived usefulness (66.2%) were descriptively more common than familiarity with the terminology (41.3%) and prior recommendation (37.8%) (Table 2; Fig. 1).

Table 2
Familiarity, clinical app use, and prior recommendation (N = 143).

Item / response	n	%
Familiar with the term “digital therapeutic applications”		
Yes	59	41.3
No	84	58.7
Frequency of clinical app use		
Never	9	6.3
Rarely	20	14.0
Sometimes	41	28.7
Often	46	32.2
Very often	27	18.9
Previously recommended a digital therapeutic application		
Yes	54	37.8
No	89	62.2
All items were answered by all 143 respondents. Labels were standardised for clarity. Prior recommendation of a digital therapeutic application was treated as a behavioural proxy for prescription digital therapeutic adoption.		

All items were answered by all 143 respondents. Labels were standardised for clarity. Prior recommendation was treated as a behavioural proxy for adoption of digital therapeutic applications in this study; it did not verify prescription or sustained clinical use.

3.3. Perceived usefulness

Respondents were broadly positive about the clinical value of digital therapeutic applications, with item means ranging from 4.07 to 4.18 on the five-point scale. Endorsement (a rating of 4 or 5) was highest for the statement that such applications help patients better understand their condition (81.0%), followed by improved treatment adherence (79.6%) and support for chronic disease management (75.9%). Agreement that the applications could reduce unnecessary clinic visits (73.0%) and support routine clinical workflows (71.1%) was somewhat lower but still endorsed by most respondents. The usefulness subscale showed high internal consistency (Cronbach's $\alpha = 0.92$; Table 3).

Table 3
Perceptions of digital therapeutic applications by subscale (five-point Likert scale).

Item	n	Mean	SD	% selecting 4–5
Perceived usefulness (α = 0.92)				
Can support routine clinical workflows	142	4.09	0.97	71.1
Can improve patients' treatment adherence	142	4.15	0.95	79.6
Help patients better understand their condition	142	4.18	0.91	81.0
Can support chronic disease management	141	4.13	0.95	75.9
Can reduce unnecessary clinic visits	141	4.07	1.01	73.0
Barriers (α = 0.91)				
Concern about data privacy and confidentiality	141	3.90	1.07	67.4
Lack of reimbursement or insurance coverage	143	3.86	1.02	65.7
Unclear legal responsibility if harm occurs	143	3.87	1.03	65.0
May complicate clinical workflow	142	3.73	1.14	62.0
Some patients may lack the technical ability	142	4.03	0.94	73.9
Acceptance and willingness (α = 0.94)				
Willing to integrate app-based therapy into practice	142	3.96	0.97	73.9
Would prescribe or recommend a certified application if available	142	4.06	0.90	76.8
Training would increase likelihood of adoption	143	4.15	0.89	81.8
Reimbursement would increase willingness to recommend	143	4.10	0.90	76.9
Expectations (α = 0.94)				
Prefer treatments supported by strong clinical evidence	143	4.19	0.91	81.8
Should be supported by national guidelines	143	4.14	1.01	77.6
Should undergo evaluation similar to medications	142	4.11	0.95	78.2
Should provide educational materials for patients	142	4.17	0.90	80.3
Should provide objective patient data	141	4.21	0.91	80.1

Items rated on a five-point scale from 1 (strongly disagree) to 5 (strongly agree); endpoint labels were displayed on the perceived-usefulness section and a numeric 1–5 scale on the remaining sections. "%

selecting 4–5" is the percentage of respondents selecting 4 or 5. Valid n varies by item (available-case analysis); item labels are standardised for clarity. α = Cronbach's alpha (complete-case) for each subscale.

3.4. Perceived barriers

Concerns about implementation were also widely held (subscale α = 0.91). The most frequently endorsed barrier was that some patients may lack the technical ability to use the applications (73.9%). This was followed by concern about data privacy and confidentiality (67.4%), lack of reimbursement or insurance coverage (65.7%), uncertainty about legal responsibility should harm occur (65.0%), and the possibility that the applications might complicate clinical workflow (62.0%). The ranking of barriers by level of endorsement is shown in Fig. 2A; this ordering is descriptive and the differences between items were not tested for statistical significance.

3.5. Acceptance, enabling factors, and implementation expectations

Acceptance of app-based therapy was generally favorable. Most respondents were willing to integrate app-based therapy into their practice (73.9%) and would prescribe or recommend a certified application if one was available (76.8%). Two potential enablers of adoption were rated highly: training was endorsed by 81.8% of respondents as something that would increase their likelihood of adoption, and 76.9% indicated that reimbursement or insurance coverage would increase their willingness to recommend such applications. Ratings of implementation expectations were similarly high, with 77.6%–81.8% selecting response option 4 or 5. Respondents most often preferred treatments supported by strong clinical evidence (81.8%), and endorsed the provision of educational materials for patients (80.3%), the provision of objective patient data (80.1%), evaluation similar to that of medications (78.2%), and support through national guidelines (77.6%). The acceptance/willingness and expectations subscales both showed high internal consistency (α = 0.94 each). The enabling and expectation items are shown ranked in Fig. 2B; these were drawn from two subscales and grouped for descriptive presentation, and do not constitute a separate scale.

3.6. Familiarity, recommendation, and respondent characteristics

Familiarity with digital therapeutic applications did not differ significantly by profession (Fisher–Freeman–Halton exact test, n = 136; Cramér's V = 0.224; p = 0.144) or by years of professional experience ($\chi^2(3) = 2.634$; Cramér's V = 0.136; p = 0.452). In an exploratory analysis, there was no evidence of an association between high perceived usefulness and prior recommendation of an application (Fisher's exact test, n = 142; odds ratio = 0.79; 95% CI 0.39–1.62; p = 0.585). Among respondents with high perceived usefulness, 63.8% (60/94) had not previously recommended an application, compared with 58.3% (28/48) of those without high perceived usefulness (Table 4).

Table 4
Inferential analyses of familiarity and prior recommendation.

Analysis	n	Test	Statistic / effect size	95% CI	p
Profession × familiarity	136	Fisher–Freeman–Halton	Cramér's V = 0.224	–	0.144
Experience × familiarity	143	Pearson χ^2	$\chi^2(3) = 2.634$; V = 0.136	–	0.452
High usefulness × recommendation	142	Fisher's exact	OR = 0.79	0.39–1.62	0.585

The profession analysis was restricted to the 136 respondents reporting a profession, grouped into five categories; associations were tested with the Fisher–Freeman–Halton exact test. CI = confidence interval; OR = odds ratio; V = Cramér's V.

 Exploratory analysis. High perceived usefulness denotes a mean of ≥ 4 across at least three of the five usefulness items; recommendation is the binary questionnaire item.

3.7. Open-ended responses

Space for free-text comment was provided at the end of the survey, and nonblank responses were received for perceived advantages (85), disadvantages or risks (73), and expected features (71). These responses were reviewed descriptively to identify recurrent topics and were not formally coded; several entries were brief or non-substantive. Recurring topics among the perceived advantages included improved accessibility and convenience, reduced cost and clinic visits, time saving, and support for treatment adherence and remote access. Responses on disadvantages mentioned the loss of direct human interaction, data privacy and security, and the exclusion of older or less digitally literate patients, together with dependence on internet access and devices and uncertainty about liability. On expected features, responses mentioned a user-friendly interface, progress tracking and reminders, secure handling of data, a means of direct contact with a clinician, and content grounded in clinical evidence. One respondent noted that a "Lack of direct therapist contact may reduce emotional support." This comment illustrates respondents' concerns about reduced personal contact.

Discussion

4.1. Principal findings

This cross-sectional survey of healthcare professionals in Abu Dhabi set out to describe familiarity with, perceptions of, and willingness to adopt digital therapeutic applications, and to examine whether familiarity varied by professional characteristics. The principal finding was a separation between broad digital engagement and familiarity with, and prior recommendation of, digital therapeutic applications. Just over half reported frequent use of general clinical applications, and perceived usefulness was high;

however, familiarity and prior recommendation were less common. There was no evidence that familiarity differed by professional role or years of experience, or of an association between high perceived usefulness and prior recommendation. These indicators are best understood as separate, population-level characteristics rather than as stages in a sequential or causal pathway; together they describe an awareness–adoption disconnect in which favourable perceptions coexist with limited familiarity and recommendation.

4.2. Interpreting the awareness–adoption dissociation

At the sample level, frequent general clinical-application use (51.0%) and high perceived usefulness (66.2%) were more common than prior recommendation of a digital therapeutic application (37.8%). This pattern is consistent with a German physician survey in which 92% believed that DiGA could improve care, although only 31% had prescribed one and self-rated knowledge was low [25]. In a large integrated healthcare delivery system, provider engagement with digital therapeutics was modest, and these tools were often treated as passive adjuncts rather than integrated components of treatment [26].

At the sample level, frequent general application use and favourable usefulness ratings coexisted with lower familiarity and recommendation. The exploratory analysis found no evidence of an association between high perceived usefulness and prior recommendation, although the wide confidence interval indicates an imprecise estimate; relationships involving the other indicators were not tested at respondent level. This is consistent with interpreting the observed gap as a set of distinct population-level characteristics rather than as evidence that engagement causes adoption. The gap between perceived usefulness and recommendation may also relate to limited formal education or preparedness in digital health, which has been described as an influence on professional acceptance [27, 28].

4.3. Perceived barriers to adoption

The barriers most frequently selected by respondents (a rating of 4 or 5)—patient technical ability (73.9%), data privacy (67.4%), absence of reimbursement (65.7%), and unclear legal liability (65.0%)—correspond closely to those reported in the wider digital health literature. Reviews have identified low digital literacy and data-security concerns among the commonly reported impediments to patient uptake and professional adoption [21, 29]. The open-ended responses descriptively reinforced these concerns, with recurring mentions of privacy, reduced personal contact, and exclusion of older or less digitally literate patients; because the responses were not formally coded, these observations are illustrative.

In the regional context, qualitative evidence from the UAE identified high implementation costs, workflow incompatibilities, data-governance concerns and uneven insurance coverage as barriers to AI and telemedicine adoption [13]. Uncertainty about legal responsibility was also widely endorsed in the present study (65.0%). Related research has identified regulatory uncertainty and the need for clearer prescribing guidance as barriers to professional use [18, 30]. The absence of structured payment models remains a further systemic obstacle, since clinicians face difficulty integrating these tools into existing workflows without dedicated time or financial incentives [31]. A concern that the applications might complicate clinical workflow was also reported by a substantial proportion of respondents (62.0%).

Collectively, these comparisons suggest that the barriers identified here are neither unique to the setting nor easily resolved at the level of the individual clinician; they are consistent with broader implementation challenges, some of which may require organisational or system-level responses.

4.4. Enabling factors and implementation expectations

Training was the most highly rated explicit adoption enabler (81.8% selecting 4 or 5), while strong clinical evidence, national guidelines, and objective patient data were highly rated implementation expectations rather than directly measured facilitators. These domains are corroborated by the literature as prerequisites for building professional confidence. Research applying technology-acceptance models has described performance expectancy—the belief that a tool will improve the quality of patient care—as an important predictor of clinical adoption [32], which is consistent with the high rating respondents gave to the provision of objective patient data (80.1%) as a support for clinical decision-making.

The high rating given to clinical evidence (81.8%) is consistent with reports that demonstrated effectiveness is among the main factors influencing whether professionals adopt a digital platform [27]. Guidance from scientific societies has likewise been identified as important for legitimising digital therapeutics within established care pathways, with professionals specifically requesting accessible evidence on effectiveness as a prerequisite for incorporating these tools into routine practice [33]. Together, these findings identify several forms of support valued by respondents, including training, clinical evidence, national guidance, and access to objective patient data.

4.5. Reimbursement and policy context

Reimbursement occupied an unusual dual position in these findings, selected as a barrier when absent (65.7%) and as an enabler when present, with 76.9% selecting a rating of 4 or 5 indicating that coverage would increase their willingness to recommend digital therapeutic applications. This pattern identifies reimbursement as a potential structural lever, and international experience illustrates its influence. Germany's Digital Healthcare Act established a structured route—commonly known as the DiGA pathway—through which eligible digital health applications may obtain statutory reimbursement. From the programme's launch in September 2020 to the end of September 2023, approximately 374,000 DiGA prescriptions were activated for patient use, illustrating the scale achievable under a structured reimbursement pathway [12]. DiGA applications are not synonymous with prescription digital therapeutics.

These observations are relevant to the UAE context described earlier. Experience from systems with established pathways suggests that reimbursement, regulatory clarity and clinical evidence may influence whether digital therapeutic applications move into routine practice.

4.6. Strengths and limitations

This study has several strengths. It drew on a multidisciplinary sample of physicians, nurses, pharmacists, physiotherapists, and allied health professionals, providing a broad view of perceptions across the workforce rather than a single professional group. All analyses were conducted on primary

response data, effect sizes were reported alongside significance tests, and an exact test was used for the profession analysis because of sparse expected cell counts. The instrument covered usefulness, barriers, acceptance, and expectations, and the subscales showed high internal consistency.

Several limitations should nevertheless be considered. The study used convenience sampling within a single emirate, which limits generalisability to the wider UAE and to other health systems. The sample was predominantly female, and respondents self-identified their profession, which was not independently verified. The sampling frame and response rate are unknown, raising the possibility of self-selection bias. The adapted questionnaire was not formally validated and its factor structure was not assessed; the high Cronbach's alpha values indicate internal consistency but not construct validity. For the barrier, acceptance, and expectation items, the response scale displayed numeric response options from 1 to 5 without verbal anchors. The respondent-level analysis of perceived usefulness and recommendation was exploratory and data-informed, and used an investigator-defined composite threshold. As a cross-sectional survey based on self-report, the study captures perceptions at a single point in time and cannot establish causal or temporal relationships; statistical power was limited, particularly across small professional groups, and the non-significant associations reported here indicate an absence of evidence for a relationship rather than evidence of its absence. Prior recommendation was self-reported and not independently verified. Importantly, the questionnaire measured the broader term "digital therapeutic applications" rather than confirmed prescription-only products, so responses should not be assumed to relate exclusively to regulated prescription digital therapeutics; prior recommendation was treated as a behavioural proxy for adoption. Finally, the open-ended responses were reviewed descriptively rather than formally coded, and are therefore intended to illustrate rather than to quantify respondents' views.

4.7. Implications and future research

This study should be interpreted in light of several limitations. First, convenience sampling within a single emirate, an unknown sampling frame and response rate, and the predominance of female respondents limit the representativeness of the sample and the generalisability of the findings beyond the participating healthcare professionals in Abu Dhabi. Professional roles and prior recommendation were self-reported and were not independently verified, introducing the possibility of reporting and self-selection biases. Second, the adapted questionnaire was not formally validated and its factor structure was not examined. Although the domain-level Cronbach's alpha values indicated high internal consistency, they do not establish construct validity. Moreover, the barrier, acceptance and expectation items were presented using numeric response options from 1 to 5 without verbal anchors. Consequently, selections of 4 or 5 should be interpreted as high-end ratings rather than unequivocal expressions of agreement. Third, the cross-sectional design captures perceptions at one point in time and cannot establish causal or temporal relationships. Statistical power was limited for comparisons involving small professional groups; therefore, the nonsignificant findings indicate that no association was detected rather than demonstrating that no association exists. The analysis of perceived usefulness and prior recommendation was exploratory and used an investigator-defined, data-informed threshold, and should

therefore be interpreted cautiously. Finally, the questionnaire referred broadly to “digital therapeutic applications” rather than verified prescription-only products. Prior recommendation consequently represents a behavioural proxy for adoption and should not be interpreted as confirmed prescribing or sustained clinical use. Open-ended responses were reviewed descriptively rather than subjected to formal qualitative coding and were used only to illustrate respondents’ perspectives.

Conclusion

This cross-sectional survey of healthcare professionals in Abu Dhabi identified an awareness–adoption disconnect frequent use of general clinical applications and favourable ratings of usefulness coexisted with lower familiarity with, and prior recommendation of, digital therapeutic applications. There was no evidence that familiarity differed by professional role or years of experience, or of an association between high perceived usefulness and prior recommendation. These indicators are best understood as separate, population-level characteristics rather than as stages in a sequential pathway. The findings suggest that favourable perceptions alone may not be sufficient for adoption, and they identify training, clinical evidence, national guidance, and reimbursement as forms of support valued by respondents and as potential priorities for implementation. Probability-based studies across multiple emirates would improve generalisability, while longitudinal or interventional research focused on regulated prescription digital therapeutics could examine determinants of routine adoption.

Declarations

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declarations of generative AI and AI-assisted technologies in the manuscript preparation process

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Author Contribution

Mona Aburahma: Conceptualization, Methodology, Formal analysis, Validation, Visualization, Supervision, Project administration, Writing – original draft, Writing – review and editing. Kiran Zahid: Conceptualization, Methodology, Formal analysis, Software, Validation, Visualization, Supervision, Project administration, Writing – original draft, Writing – review and editing. Aisha Yousif Ahmed Mohammed Alhosani: Investigation, Data curation, Writing – original draft, Writing – review and editing. Sara Abdulla Hasan Ali Almarzooqi: Investigation, Data curation, Writing – original draft, Writing – review and editing. Fatima Mohamed Shafı Mohamed Alremeithi: Investigation, Data curation, Writing – original draft, Writing – review and editing. Mouza Mohamed Salem Sultan Asaedi: Investigation, Data curation, Writing – original draft, Writing – review and editing. Mona Salem Ali Salem Albreiki: Investigation, Data curation, Writing – original draft, Writing – review and editing. All authors reviewed and approved the final manuscript.

Data Availability

The datasets generated and analysed during the current study are not publicly available because participant consent did not include unrestricted public deposition. De-identified data may be made available by the corresponding author on reasonable request, subject to institutional ethical approval and applicable data-protection requirements.

CRediT authorship contribution statement

Mona Aburahma: Conceptualization, Methodology, Formal analysis, Validation, Visualization, Supervision, Project administration, Writing – original draft, Writing – review and editing. Kiran Zahid: Conceptualization, Methodology, Formal analysis, Software, Validation, Visualization, Supervision, Project administration, Writing – original draft, Writing – review and editing. Aisha Yousif Ahmed Mohammed Alhosani: Investigation, Data curation, Writing – original draft, Writing – review and editing. Sara Abdulla Hasan Ali Almarzooqi: Investigation, Data curation, Writing – original draft, Writing – review and editing. Fatima Mohamed Shafı Mohamed Alremeithi: Investigation, Data curation, Writing – original draft, Writing – review and editing. Mouza Mohamed Salem Sultan Asaedi: Investigation, Data curation, Writing – original draft, Writing – review and editing. Mona Salem Ali Salem Albreiki: Investigation, Data curation, Writing – original draft, Writing – review and editing. All authors reviewed and approved the final manuscript.

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Figures

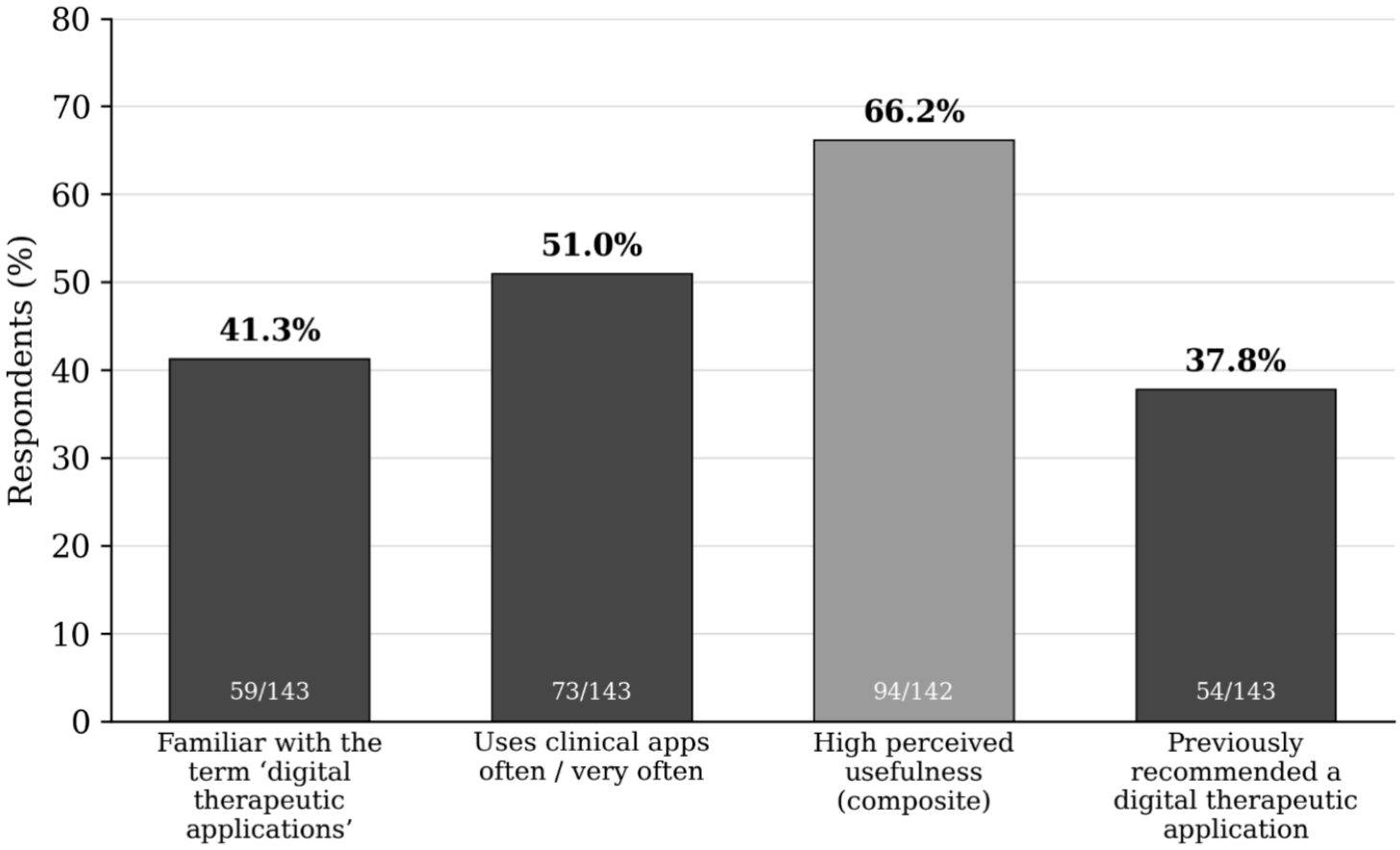


Figure 1

Familiarity, general clinical-application use, perceived usefulness and prior recommendation of digital therapeutic applications among healthcare professionals. Bars represent independent population-level indicators and should not be interpreted as stages in a sequential adoption pathway. Frequent clinical-application use refers to general clinical applications, not specifically to prescription digital therapeutics. High perceived usefulness was defined as a mean score of ≥4 among respondents who completed at least three of the five usefulness items. Available-case analysis was used; numerators and valid denominators are displayed within the bars (N = 143 overall).

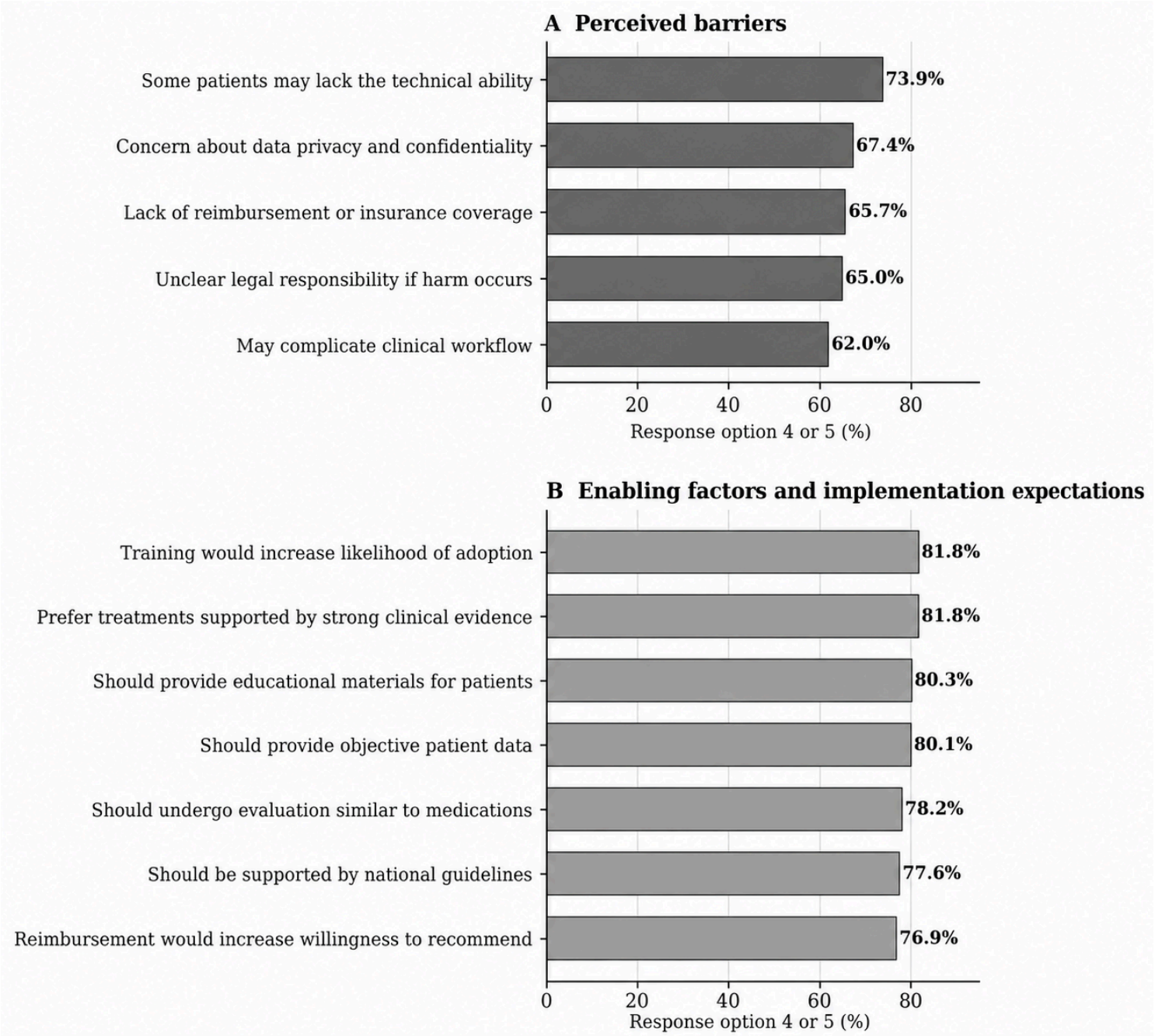


Figure 2

Perceived barriers, enabling factors and implementation expectations concerning digital therapeutic applications among healthcare professionals. Panel A presents the five individual items from the Barriers subscale. Panel B presents individual items from the Acceptance/willingness and Expectations subscales; these were grouped descriptively and do not constitute a separate facilitator scale. Bars show the percentage selecting response option 4 or 5 on the five-point scale, operationalised analytically as agreement. Available case analysis was used, with valid denominators ranging from 141 to 143 (N = 143 overall). Items are ranked descriptively within each panel; differences between items were not significance-tested.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryS1Questionnaire.docx
- SupplementaryS2STROBEcompleted.docx