Review

Using telehealth consultations for healthcare provision to patients from non-Indigenous racial/ethnic minorities: a systematic review

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ABSTRACT

Objective: The COVID-19 pandemic has seen a rapid adoption of telehealth consultations, potentially creating new barriers to healthcare access for racial/ethnic minorities. This systematic review explored the use of telehealth consultations for people from racial/ethnic minority populations in relation to health outcomes, access to care, implementation facilitators and barriers, and satisfaction with care.
Materials and Methods: This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis and the Joanna Briggs Institute Manual for Evidence Synthesis. Five major databases were searched to identify relevant studies. Screening, full-text review, quality appraisal, and data extraction were all completed independently and in duplicate. A convergent integrated approach to data synthesis was applied with findings reported narratively.
Results: A total of 28 studies met the inclusion criteria. Telehealth-delivered interventions were mostly effective for the treatment/management of physical and mental health conditions including depression, diabetes, and hypertension. In several studies, telehealth improved access to care by providing financial and time benefits to patients. Technological difficulties were the main barriers to effective telehealth consultation, although overall satisfaction with telehealth-delivered care was high.
Discussion: Telehealth-delivered care for racial/ethnic minorities offers promise across a range of conditions and outcomes, particularly when delivered in the patient's preferred language. However, telehealth may be problematic for some due to cost and limited digital and health literacy.
Conclusion: The development and implementation of guidelines, policies, and practices in relation to telehealth consultations for racial/ethnic minorities should consider the barriers and facilitators identified in this review to ensure existing health disparities are not exacerbated.

Key words: telehealth, telemedicine, minority health, systematic review, racial/ethnic minorities

BACKGROUND AND SIGNIFICANCE

The global COVID-19 pandemic has seen a rapid adoption of telehealth in lieu of face-to-face consultations due to the need for social distancing and minimization of patient and healthcare provider physical contact.[1–3] As a result, the use of telehealth to deliver healthcare services has become widespread.[4] Implementation has been rapid with little evidence to guide such widespread adoption and insufficient attention to disparities and digital and health

literacy. Consequently, there is a risk that quality of care could be compromised and new access barriers may emerge for underserved groups such as non-Indigenous racial and ethnic minorities who already experience health disparities.[5,6]

Telehealth consultations, including telemedicine, involve the use of telecommunication technologies between healthcare providers from any healthcare or social care discipline and patients in real time to transmit voice, images, and data for healthcare and health education.[7] Using telehealth consultations, healthcare providers can deliver healthcare services and information directly to patients located elsewhere, enable patients to find providers who share their lived experiences and address access problems related to distance and transport, waiting times, cost, and limited patient and clinician time.[7–10] Pre-COVID-19, telehealth consultations in Western countries were largely limited to rural and remote patients, psychiatry or niche subspecialties such as cancer genetics.[11–14]

Existing systematic reviews of telehealth have been conducted in various clinical settings with generally positive findings in relation to patient satisfaction outcomes and consultation effectiveness.[15–17] In a review of quantitative studies, healthcare delivered by videoconferencing was effective in assessing and improving patients' health conditions in 98% of included studies and telehealth improved treatment compliance and accountability for some participants.[18] Additionally, telehealth services have been found to improve access to care, and communication and engagement with clinicians from patients' and informal carers' perspectives.[16] However, telehealth services were not an effective means of psychosocial support in some studies and poor audio-visual quality limited patients' satisfaction with healthcare.[16]

Other recent reviews have found telehealth to improve access to healthcare and be acceptable to Indigenous peoples.[19–21] Barriers to telehealth services (eg, lack of technical skills) have been identified as well as important enablers such as engagement with Indigenous communities and consideration of local cultural beliefs.[22] As First Nations peoples, Indigenous communities are the original inhabitants of their country. The history of attempted genocide and ongoing maltreatment experienced by many Indigenous communities has resulted in significant mistrust of mainstream healthcare services.[22] The health needs of Indigenous peoples are unique due to colonization, dispossession, genocide, and forced removal from lands.[23,24] Importantly, the strength, resilience, and advocacy of Indigenous peoples, as evident in community-controlled health services in some countries, has led to different healthcare systems and supports.[24] These address the social determinants of health and political advocacy as well as clinical interventions to treat disease.[19–22] Issues related to health equity experienced by Indigenous peoples and their community-based responses to these issues are therefore different from non-Indigenous racial/ethnic minorities.

Patients and communities from non-Indigenous racial/ethnic minorities are at risk of poorer health outcomes than the majority population because of structural inequities, including lack of access to health information in languages other than English, underutilization of interpreter services, lack of culturally appropriate services, and racism and discrimination.[25–29] The use of telehealth consultations may further complicate healthcare access for patients from racial/ethnic minority backgrounds due to other structural issues such as health and digital literacy issues, and challenges in navigating mainstream healthcare systems.[29,30] These access barriers are potentially heightened during the COVID-19 pandemic.[7]

Despite previous reviews of telehealth effectiveness for different patient populations such as older populations, rural and remote communities, and Indigenous peoples, no reviews have been undertaken of studies assessing telehealth consultations specifically for patients and communities from non-Indigenous racial/ethnic minority backgrounds. An evidence synthesis focused on patients and communities from non-Indigenous racial/ethnic minority groups would generate an evidence base for the tailoring of telehealth consultations to their diverse needs.

OBJECTIVE

The objective of this review was to explore the health outcomes, implementation facilitators and barriers, and satisfaction with care, in relation to telehealth consultations for racial/ethnic minority populations in order to make recommendations for practice and future research.

MATERIALS AND METHODS

The study design was a systematic review in accordance with the recommendations of the Joanna Briggs Institute (JBI).

Information sources and search strategy

The protocol for this systematic review was registered in the international register of systematic reviews PROSPERO (CRD 42020221017) and was conducted in accordance with the PRISMA guidelines.[31] Studies were identified from a search of the following 5 electronic databases: Ovid Medline, Ovid PsycINFO, EMBASE, CINAHL via EBSCOhost and Scopus. The search was limited to studies published in English between January 1, 2005 and October 9, 2020. Reference lists of included studies were hand-searched for relevant studies.

A list of terms was formulated for the concepts: "telehealth" and "racial or ethnic minority." These terms were mapped to subject headings (eg, Medical Subject Headings or equivalent) and keywords. Boolean operators were used to group subject headings and keywords to create a search strategy (Supplementary File). A medical research librarian provided input into the search strategy, and a "gold set" of key articles was used to check the comprehensiveness of the search strategy.

Eligibility criteria

To be included in the review the study had to meet the following inclusion criteria:

a. Sample population included patients of any age from racial/ethnic minorities, their carers or healthcare staff who provided care to racial/ethnic minorities, with study findings disaggregated by racial/ethnic minority group.
b. For this review, we describe the intervention as "telehealth consultation." Telehealth consultations occurred instead of a face-to-face consultation (eg, via telephone, videoconferencing) to provide a health service such as a clinical assessment or diagnosis and/or management of a health condition (physical or mental).
c. Included telehealth consultations in healthcare settings (eg, hospitals, primary care clinics) and in any countries to ascertain the breadth of research internationally. If the provider is in a healthcare setting but the patient is located in a non-healthcare setting (eg, home), then the study is included.

d. Reported individual health outcomes (eg, physical health, mental health) that could be related to patients/health consumers and caregivers, and/or:

e. Reported health service outcomes (eg, readmission rates, barriers to implementation). Health service level outcomes may be related to access to care, service delivery, satisfaction with care, and cost-effectiveness.

f. Used quantitative, qualitative, or mixed methods study designs.

g. Published in a peer-reviewed journal.

Exclusion criteria were:

a. Studies did not include participants from racial/ethnic minorities or did not disaggregate findings by racial/ethnic background.

b. Support services provided as standard practice (eg, phone interpreting, telemonitoring without direct interaction with a healthcare provider) were excluded. Studies that primarily focused on delivery of health promotion and screening programs or health-related education via telehealth.

c. Publications that were opinion pieces, systematic reviews and meta-analyses, conference abstracts or proceedings, duplicate publications using the same sample and reporting the same outcomes.

d. Studies published in languages other than English.

The social determinants of health are different for Indigenous peoples compared with other racial/ethnic minorities due to colonization and dispossession. Reviews of telehealth consultations and healthcare for Indigenous peoples have been published.[19–22,32] Thus, we did not include Indigenous peoples in the current review. For the purpose of exclusion, we accepted authors' definitions of "Indigenous participants" as contained in their published reports. All studies, with the exception of one, met our inclusion criteria and only contained non-Indigenous racial/ethnic minority populations. One study, primarily focused on African American patients, had 1 (2.9%) participant who was identified as being American Indian.[61]

Our definition of "racial/ethnic minority" is based on the term "culturally and linguistically diverse" which is commonly used in Australia (where the authors are based) and refers to "groups and individuals of all genders and all ages who differ from the population in which they live according to race, language and ethnicity except those whose ancestry is Anglo-Saxon, Anglo-Celtic, Indigenous, Aboriginal or Torres Strait Islander."[33]

Data screening and extraction

Search results were exported from the electronic databases into systematic review management platform Covidence (Veritas Health Innovation, 2021). Screening was undertaken in 2 phases. Following the removal of duplicates, studies were screened independently in duplicate by 2 reviewers on title and abstract. Conflicts were resolved by a third reviewer. In the second phase, full-text articles were screened independently in duplicate by 2 reviewers, and conflicts were resolved by a third reviewer.

Data extraction was performed by 2 reviewers using Covidence, with differences resolved by a third reviewer. Extracted data comprised the characteristics of each study: country of study, health setting, study aim, study design, sample size and participants' characteristics (eg, gender, age, race/ethnicity/cultural background), health conditions, and the details of the telehealth intervention. Data were also extracted pertaining to study findings: health out-

comes (eg, blood pressure, depression symptoms) and access to healthcare and delivery outcomes (eg, satisfaction with care, implementation barriers and facilitators).

Methodological quality assessment of studies

Risk of bias and critical appraisal were conducted independently in duplicate by 2 reviewers using the JBI Critical Appraisal tools.[34] These tools assess the methodological quality of studies of various designs and the extent to which the risk of bias is addressed by authors. For each criterion assessed as "met" on the appropriate tool, a score of "1" was applied. Where criteria were assessed as "not met" or if it was "unclear" to the reviewer, a score of "0" was applied. The scores were then calculated for each study and converted to a final quality rating of "low," "moderate," or "high." (See Supplementary File for JBI critical appraisal criteria for each study design.)

For mixed methods studies, we used 2 screening questions and 5 questions from the "mixed methods studies" section of the Mixed Methods Appraisal Tool,[35] which are related to the rationale for using a mixed methods study design and level of interpretation and integration of the qualitative and quantitative components of the study.[35]

Synthesis of studies

Extracted data were exported from Covidence into a Microsoft Excel spreadsheet for analysis. A convergent integrated approach to data synthesis was taken in accordance with the JBI methodology for mixed methods systematic reviews.[34] Due to the heterogeneity of study methodology, design, sample characteristics, and outcome measures, there was no opportunity to conduct a meta-analysis of quantitative studies or a meta-synthesis of qualitative studies. A narrative synthesis was thus conducted where both qualitative and quantitative data were tabulated together and categorized according to the 4 outcomes of interest: health outcomes, implementation barriers and facilitators to telehealth consultations, access to healthcare, and satisfaction with care. A descriptive comparison between studies reporting on the same outcome was performed, with similar and divergent findings reported. Study characteristics, such as country and setting, study methodology and design, sample sizes, and participant characteristics, were examined by calculating frequencies and proportions.

RESULTS

Study selection

The combined searches from the 5 databases identified 3314 unique articles which were screened using the inclusion and exclusion criteria. A total of 28 articles met the inclusion criteria (Figure 1).

Study characteristics

Studies were published between 2005 and 2019 and comprised 4256 patients and 12 caregivers from racial/ethnic minorities, and 34 healthcare practitioners. Twenty-six (92.9%) studies examined adult populations and 2 focused on pediatric populations.[36,37] The majority of studies ($n = 23$, 82.1%) examined groups located in the United States and utilized quantitative study designs ($n = 19$, 67.9%). The most common health conditions examined were mental health conditions ($n = 17$, 60.7%), of which 9 focused on depression. The most frequent study setting was community health centers ($n = 8$, 28.6%), followed by primary health clinics ($n = 5$, 17.9%), psychiatric or trauma treatment centers ($n = 4$, 14.3%), the general community (eg, churches) ($n = 3$, 10.7%) and HIV clinics ($n = 2$, 7.1%). The racial/ethnic minority populations included in the stud-
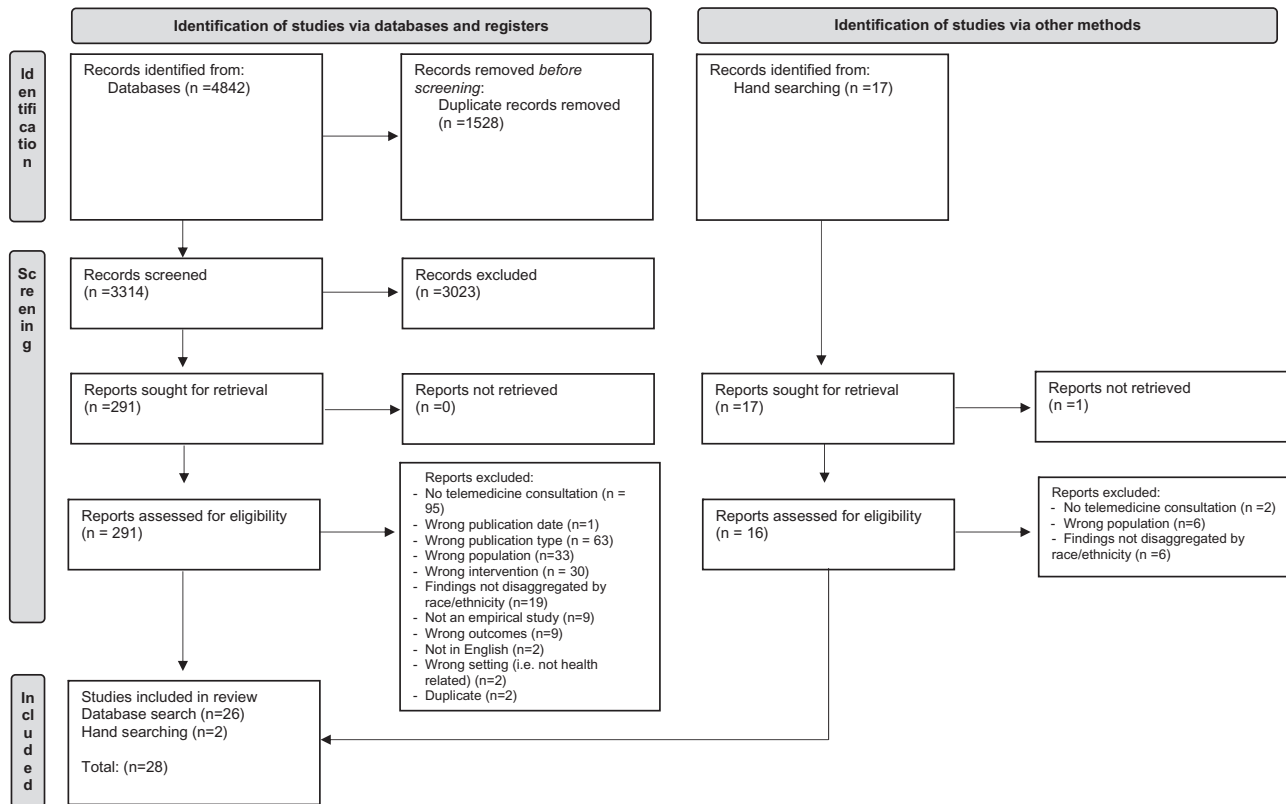
Figure 1. Flow diagram of study selection. Adapted from PRISMA flow-chart.[31]

ies were predominantly Latino/a or Hispanic ($n = 13$, 46.4%) and African American ($n = 7$, 25.0%). Seven studies included Asian participants from Korean and Chinese communities, 3 studies included participants from refugee and immigrant backgrounds, and 1 study described their minority population as "non-white ethnic group." Six studies included participants from more than 1 racial/ethnic group. Two studies included patients from both racial/ethnic minorities and the majority population and reported results disaggregated by race/ethnicity. Characteristics of included studies are presented in Table 1. (See Supplementary File for detailed information related to study characteristics.)

Quality assessment

The quality of the included studies was varied with numerous studies not reporting sufficient information to replicate their methods (see Supplementary File). All 11 randomized controlled trials (RCTs) reported randomization of study participants. There was variation in the reporting of allocation concealment and differences in baseline characteristics between groups in some RCTs; however, most reported completion of follow-up assessments and an intent to treat approach to data analysis. As all RCT studies investigated a telehealth consultation between a practitioner and a patient, blinding of participant and practitioner was not possible. Accordingly, no RCT studies reported blinding of participants to intervention group or blinding of practitioners delivering the intervention to group allocation. The number of quality indicators for RCT studies reported ranged from 3/10 to 7/10. Each of the 2 quasi-experimental studies employed a pre/post design with small sample sizes and limited methodological rigor. The quality of reporting for the 1 study utilizing a cohort design and for the 1

study using a case series design was high. Overall, the quality of reporting for studies using cross-sectional, mixed methods, and qualitative designs was low to medium.

Telehealth consultations

Data pertaining to telehealth consultations are presented in Table 2. Across the included studies, telehealth consultations were primarily mental health consultations ($n = 17$, 60.7%) such as cognitive behavioral therapy (CBT) or psychiatry (telepsychiatry). Physical health consultations were related to chronic disease management ($n = 9$, 32.1%) and clinical monitoring ($n = 2$, 7.1%). Physical health diseases managed by telehealth included diabetes ($n = 2$, 7.1%), hypertension ($n = 3$, 11%), and infectious diseases ($n = 2$, 7.1%). Telehealth consultations were used to monitor patients' clinical status in 2 studies. One study used a telephone triage system and computer-supported decision-making software to conduct a clinical assessment (eg, self-care advice from a clinician).[38] (Telephone triage is an approach for handling requests for same-day doctor appointments; when a patient telephones a clinic to request a face-to-face appointment with a provider, their need for an appointment is assessed and the most appropriate management plan arranged.[39]) The other study monitored patients' vital signs and other health related information "remotely," and this was then used to inform virtual consultations by a nurse practitioner who discussed the patient's medications and recent health data.[40]

The telehealth consultations and interventions were delivered by a range of healthcare professionals including: nurses ($n = 10$, 35.7%)[38,40–48]; physicians ($n = 13$, 46.4%)[38,43,45,46,48–57] including psychiatrists, primary care physicians, and specialists; allied health professionals ($n = 9$, 32.0%)[36,37,52,58–63] such as social workers,

Table 1. Summary of included telehealth articles (*n* = 28)

		n	%
Study location	United States	23	82.1
	Australia	1	3.6
	Denmark	1	3.6
	Denmark and Sweden	1	3.6
	Korea, Vietnam, Cambodia, and Uzbekistan	1	3.6
	United Kingdom	1	3.6
Year published	2005–2009	3	10.7
	2010–2014	16	57.1
	2015–2019	9	32.1
Study design	Randomized controlled trial	11	39.3
	Cohort	1	3.6
	Quasi-experimental	2	7.1
	Cross-sectional	4	14.3
	Case series	1	3.6
	Mixed methods	6	21.4
	Qualitative	3	10.7
Study setting	Community health center	8	28.6
	Primary care clinic	5	17.9
	Psychiatric or trauma treatment center	4	14.3
	General community	3	10.7
	HIV clinic	2	7.1
	Other	6	21.4
Health condition[a]	Mental health	17	60.7
	Cardiovascular related (eg, hypertension)	8	28.6
	Diabetes	5	17.9
	Infectious diseases (eg, HIV, Hepatitis C)	2	7.1
	Primary care	1	3.6
	Health counseling	1	3.6
Racial/ethnic background of minority participants[b]	Hispanic/Latino/a	13	46.4
	African American	7	25.0
	Korean and Korean American	5	17.9
	Chinese American	2	7.1
	Other (eg, refugees, non-white ethnic group)	4	14.3

Note: Percentages may not add up to 100 due to rounding.
[a]Some studies included more than 1 health condition.
[b]Some studies included participants from more than 1 racial/ethnic group.

counselors, and psychologists; and paraprofessional outreach workers in 1 study.[45] In 18 studies (64%), the healthcare professionals delivering the telehealth intervention were bilingual. The mode used to deliver the telemedicine intervention was videoconferencing in 16 studies (57.1%) and telephone in 11 studies (39.3%); 1 study used both internet video and telephone communication.[45]

Health outcomes

In total, 14 studies measured health outcomes with evidence of effectiveness of telehealth on measures of mental health, cardiovascular health and diabetes related outcomes. Three RCTs focused on health outcomes related to treatment of depression, assessing the effect of a telehealth CBT intervention on depression severity compared with face-to-face CBT[61,64] or compared with usual care.[59] Among Latino patients, worry symptoms were reduced[64] and depression symptoms were improved[61] following the use of culturally adapted telephone-based CBT compared to face-to-face CBT. In the study by Dwight-Johnson et al,[59] Latino patients receiving culturally adapted telephone-based CBT showed greater improvement in depression symptoms over 6 months compared to patients who received usual care.

The effects of telepsychiatry consultations or remote management on improving depression outcomes were reported in 3 RCTs.[49,52,55] In a study of Hispanic patients with depression, monthly telepsychiatry consultations and usual care were equally effective in reducing depression scores after 6 months.[49] In another pilot RCT,[52] telephone-based depression care management plus usual care was compared with the usual care only group. Findings showed a trend for lower levels of depression in the intervention group over time compared with the control group.[52] In another study, the effectiveness of culturally sensitive telepsychiatry treatment and care management was compared to usual care for Chinese Americans with depression.[55] This study found greater improvement in depressive symptoms following telepsychiatry compared with usual care.[55] In a single group pretest posttest design with Korean immigrants, weekly sessions of telepsychiatry for 4 weeks significantly reduced depression scores at immediate follow-up and at 3-month follow-up.[62] In a pilot study using a pre-post 2 group design focusing on African American caregivers of older adults with dementia, telephone-based and face-to-face CBT interventions were equally effective in reducing depression scores.[60]

Three studies assessed the effects of telehealth on cardiovascular and diabetes health outcomes.[43–45] In 1 RCT study of patients with hypertension from Korea, biweekly and monthly hypertension-

Table 2. Characteristics of included studies by study design

First author, year	Country	Health condition	Sample size and participant race/ethnicity	Telemedicine intervention and comparison group	Relevant study outcomes and tools	Summary of results
Randomized controlled trial						
Alcántara 2016[64]	USA	Mental health (Depression)	Total $n = 257$; Latino	Telephone plus care management CBT 6–8 weekly/biweekly sessions Comparisons: usual care, face-to-face ECLA	- Worry symptoms (PSWQ) - Satisfaction with care	Telephone ECLA significantly* reduced worry symptoms.
Chong 2012[49]	USA	Mental health (Depression)	Overall $n = 167$; Hispanic	Video-telepsychiatry consultations Comparison: usual care	- Depression (PHQ-9) - Impairment (SDS) - Satisfaction (VSQ-9)	Telepsychiatry for depression was acceptable, less definite support for feasibility.
Dwight-Johnson 2011[59]	USA	Mental health (Depression)	Total $n = 101$; Latino	Telephone CBT 8 sessions Comparison: usual care	- Depression (PHQ-9, SCL)	Telephone CBT resulted in significantly* lower depression scores at 6-month follow-up.
Han 2010[42]	USA	Hypertension	Total $n = 360$; Korean	Telephone counseling MIC= biweekly counseling LIC= monthly counseling 12-month duration	- Health behavior outcomes (self-report)	Telephone counseling resulted in improved hypertension management outcomes for both groups.
Himelhoch 2013[61]	USA	Mental health (Depression)	Total $n = 34$; AA = 32, AI = 1, other = 1, Hispanic = 2	Telephone CBT 11-sessions Comparison: face-to-face CBT	- Depression (HAM-D, QID-R - Satisfaction (SIMH)	Telephone CBT and usual care resulted in significant* decrease in depression.
Jackson 2012[43]	USA	Hypertension	Overall $n = 573$; AA = 284, white = 289	Arm 1: HBPM with remote medication management. Arm 2: HBPM with telephone behavioral management. Arm 3: Combined: HBPM, medication management, behavioral intervention Arm 4/control group: usual care	- Mean systolic and diastolic blood pressures	Significant* improvement in mean systolic BP for African American patients in Arm 3 at 12 and 18 months compared to usual care. Significant* improvement in mean diastolic BP for African American patients in Arm 3 at 18 months compared to usual care. There were no analogous differences for white patients.
Kim 2011[44]	USA	Hypertension	Total $n = 359$; Korean	Telephone counseling MIC= biweekly, LIC= monthly counseling 12-month duration	- Mean systolic and diastolic blood pressures - HBP knowledge and self-efficacy - Depression (KDSKA) - Medication adherence (HBCS)	Significant* improvement in BP for both groups over every 2-week period.
Moreno 2012[50]	USA	Mental health (Depression)	Overall $n = 182$; Hispanic	Telepsychiatry consultations 6 monthly sessions over 3 years Comparison: usual care	- Depression (MADRS, PHQ-9) - Quality of life (Q-LES-Q, SDS)	Telepsychiatry resulted in significant* reduction in depression.
Vahia 2015[53]	USA	Mental health	Total $n = 27$; Latino			

(continued)

Table 2. continued

First author, year	Country	Health condition	Sample size and participant race/ethnicity	Telemedicine intervention and comparison group	Relevant study outcomes and tools	Summary of results
Warren 2015[38]	United Kingdom	Primary care	Total $n = 12\,132$; white $= 11276$, other ethnic $= 476$	Telepsychiatry for neuro-cognitive assessment. Comparison: usual care. Telephone triage using computer-supported decision-making software by doctor or nurse. Comparison: usual care	- Neurocognition (MMSE, HVLT-revised, Digit Span subtest, BVMT-R) - Satisfaction and ease of accessing care	No significant differences in test performance between control and intervention test. Patients from ethnic minorities reported higher satisfaction in GP triage compared to usual care, whereas white patients reported higher satisfaction with usual care.
Yeung 2016[55]	USA	Mental health	Total $n = 190$; Chinese	Telepsychiatry consultations. Comparison: usual care	- Depression (HDRS17) - Illness severity (CGI-S, CGSI-I) - Quality of life (Q-LES-Q)	Telepsychiatry resulted in significant* decreases in depression.
Cohort						
Berg 2009[41]	USA	Diabetes	Total $n = 980$; Hispanic	Telephonic disease management diabetes program and scheduled nurse education sessions. 24-h access to a nurse counselor. Comparison: usual care.	- Medical service utilization, prescription drug use, procedures performed - Costs of care	Intervention resulted in significant* reductions in inpatient bed days and higher rates of medicine use.
Quasi-experimental[a]						
Jang 2014[62]	USA	Mental health (Depression)	$n = 14$; Korean	Video-telecounseling consultations 4 weekly sessions (30 min each)	- Depression (PHQ-9) - Satisfaction with care (CSQ)	Intervention resulted in reduced depressive symptoms at 3-month follow-up.
Mayes 2010[45]	USA	Diabetes	$n = 16$, Hispanic	Video-telehealth consultations assisted by Promotoras and primary care physician connecting to a medical specialist	- Weight, systolic and diastolic blood pressures, HbA1c	Positive feasibility outcomes (telehealth protocols were successfully executed by staff) Intervention resulted in a significant* decrease in HbA1c.
Cross-sectional[a]						
Mucic 2010[51]	Denmark and Sweden	Mental health	$n = 61$; refugees $= 45$, asylum seekers $= 12$, migrants $= 3$, domestic $= 1$	Video-telepsychiatry consultations	- Satisfaction with telehealth	Overall high level of satisfaction with video-telepsychiatry consultations.
Park 2019[46]	Korea, Vietnam, Cambodia, Uzbekistan	Health counseling	$n = 442$; Korean	Video-telehealth counseling	- Satisfaction with telehealth	Overall user satisfaction rates were 96.1% with telehealth.
Schulz 2014[48]	Australia	Infectious diseases	$n = 119$; refugees $n = 29$ doctors	Video-telehealth consultations	- Patient travel avoided - Bandwidth and latency variations	Median distance patient travel distance saved was 494 km. Total saved $= 54\,000$ km.
Yeung 2009[56]	USA	Mental health	$n = 9$; Chinese	Video-telehealth consultations	- Clinical improvement (CGSI-I) - Satisfaction with telehealth	Overall high satisfaction with telehealth among patients and nurses.
Case series[a]						
Stewart 2017[36]	USA	Mental health	$n = 4$; Hispanic	Weekly video-telehealth TF-CBT sessions	- Trauma exposure and posttraumatic stress symptoms (UCLA PTSD RI) - Depression (CDI) - Anxiety (SCARED-child)	Positive feasibility outcomes (participants completed treatment and clinicians adhered to TF-CBT model).

(continued)

Table 2. continued

First author, year	Country	Health condition	Sample size and participant race/ethnicity	Telemedicine intervention and comparison group	Relevant study outcomes and tools	Summary of results
Mixed methods						
Bagchi 2018[40]	USA	Diabetes, hypertension	n = 10; AA	Video-telehealth consultations	- Satisfaction with telehealth	Overall high satisfaction with telehealth.
Glueckauf 2012[60]	USA	Mental health (Depression)	Total n = 12; AA caregivers	Telephone CBT Twelve, 1-h, weekly sessions Comparison: face-to-face CBT	- Depression (PHQ-9) - Satisfaction with program	Telephone and face-to-face CBT showed improvements in depression.
Mucic 2007[57]	Denmark	Mental health	n = 23; refugees	Video-telepsychiatry consultations	- Satisfaction with telehealth	Overall high satisfaction with telepsychiatry.
Stewart 2017[37]	USA	Mental health	n = 15; Hispanic = 7, AA = 6, white = 2	TF-CBT via video Weekly sessions (range 12–19 in total)	- Trauma exposure and posttraumatic stress symptoms (UCLA PTSD RI) - Depression (SMFQ) - Anxiety (SCARED-child) - Satisfaction with telehealth (TSQ) - Child emotional and behavioral problems (CBLC)	Intervention resulted in significant* reduction in posttraumatic stress disorder symptoms.
Uebelacker 2011[52]	USA	Mental health (Depression)	Total n = 38; Latino	Telehealth depression care management via telephone Comparison: usual care	- Depression (D-HELP) - Satisfaction with care (CSQ) - Treatment utilization	Trend for the intervention group to experience less depression in time.
Ye 2012[54]	USA	Mental health	n = 16; Korean	Video-telehealth consultations	- Feasibility of telepsychiatry	Overall, high level of acceptance with telehealth.
Qualitative[a]						
Aisenberg 2012[58]	USA	Mental health (Depression)	Overall n = 56; Latino n = 5 doctors	Telephone CBT 8 sessions	- Satisfaction with care - Experiences with telehealth - Barriers with treatment	Overall high satisfaction among patients and providers.
Pekmezaris 2016[47]	USA	Heart failure	n = 4; AA, Hispanic	Video-telemonitoring consultations Weekly for 3 months	- Barriers to implementation or usability	Two major themes related to improving equipment and participant engagement in future research.
Saberi 2013[63]	USA	HIV	n = 14; AA	Video-telehealth consultations	- Experiences with telehealth	Participants found telehealth to be convenient, efficient, and positive.

AA: African American; AI: American Indian; BVMT-R: Brief Visuospatial Memory Test (revised); CBLC: Child Behavior Checklist; CBT: cognitive behavioral therapy; CGI-S: Clinical Global Impressions-Severity of Illness; CGS-I: Clinical Global Impressions-Improvement; CSQ: Client Satisfaction Questionnaire; D-HELP: Depression Health Enhancement for Latino Patients; ECLA: Engagement and Counseling for Latinos intervention; HIV: Human Immunodeficiency Virus; HBCS: Hill-Bone Compliance Scale; HBP: high blood pressure; HBPM: home blood pressure monitoring; HDRS17: Hamilton Depression Rating Scale; HVLT-revised: Hopkins, Verbal Learning Test-Revised; KDSKA: Kim Depression Scale for Korean Americans; GP: general practitioner (ie, primary care physician); MADRS: Montgomery-Åsberg Depression Rating Scale; MMSE: Mini-Mental State Examination; PHQ-9: Personal Health Questionnaire-9; PSWQ: Penn State Worry Questionnaire; QID-R: Quick Inventory of Depression self-report; Q-LES-Q: Quality of Life Enjoyment and Satisfaction Questionnaire; SCARED: Screen for Children's Anxiety Related Emotional Disorders, Child Version; SCL: Hopkins Symptom Checklist; SDS: Sheehan's Disability Scale; SIMH: Satisfaction Index-Mental Health; SMFQ: Short Mood Feeling Questionnaire; T-CSCT: Telepsychiatry-based Culturally Sensitive Collaborative Treatment; TF-CBT: trauma-focused cognitive behavioral therapy; TSQ: Telehealth Satisfaction Questionnaire; UCLA PTSD RI: University of California at Los Angeles Posttraumatic Stress Disorder Reaction Index for DSM-5; VSQ-9: Visit Specific Satisfaction Questionnaire.

[a]Nil comparison group.

*P < .5.

related telephone counseling, and 12-month home monitoring of BP were effective in improving long-term BP outcomes.[44] The second study assessed the effectiveness of a telemedicine intervention emphasizing medication management and home BP monitoring with African American patients living with hypertension.[43] It found significant improvement in mean systolic blood pressure at 12 months and at 18 months following the intervention compared with usual care, but there were no analogous differences for white patients.[43] A study of Hispanic patients living with type 2 diabetes found that telehealth monitoring significantly improved participants' blood glucose regulation.[45] In summary, telehealth was found to have contributed to reduced depression symptoms and improved blood pressure and blood glucose management.

Barriers and facilitators to implementation of telehealth

The majority of studies ($n = 17$, 60.1%) provided technology access and support to participants (eg, patients were provided with videoconferencing equipment, patients attended digital health centers or primary health clinics with specialized telehealth equipment) as part of their telehealth intervention.[36,37,40,42,44–46,48–50,53–57,62,63] Three studies identified technology as a barrier to the implementation of telehealth, which was not unique to a health condition or study design. A mixed method study involving African Americans and Hispanics with mental health conditions identified initial issues with patients logging into the videoconferencing software and technical problems with the equipment.[37] In a cross-sectional study involving refugees with infectious diseases, technical difficulties as rated by medical specialists were reported in a quarter of the first telehealth consultations, although this significantly improved with experience.[48] A qualitative study involving African Americans and Hispanics with heart failure found that patients had initial concerns with using the equipment, but these dissipated with use.[47] This study also reported issues with internet connection, patients managing the intervention alone at home, and concerns with patient literacy. The combined use of audio and text in the telemonitoring program assisted patients' understanding.[47]

Factors facilitating use of telehealth were not unique to a health condition or racial/ethnic background. Telehealth consultations using videoconferencing supported health professionals to provide education to patients with mental health conditions by sharing PowerPoint presentations and other written material.[36,37] Telehealth permitted caregiver engagement and could be delivered in a language of the patient and caregiver's preference.[36,37] Strategies to assist with telehealth consultations included: face-to-face meetings prior to establishing telehealth to build relationships[37] and use of a telemonitoring program with text and audio to help patients understand the instructions.[47] In summary, barriers to telehealth were mostly due to technology-related issues, and various strategies were used to facilitate telehealth use such as prior face-to-face meetings and providing text and audio materials.

Access to healthcare

Telehealth improved access to healthcare in a variety of areas. Patients from ethnic minorities reported ease of access to medical help through the GP telephone triage system (vs. usual care) compared with white patients; however, patients from ethnic minorities appeared to report poorer absolute scores than white patients across all 3 trial arms (nurse triage, GP triage, usual care).[38] Patients with HIV reported that telehealth allowed quick access to their providers, was more convenient and comfortable in comparison to routine clinic visits, and reduced the need for travel which increased their likelihood of attending appointments.[63] Patients with diabetes and hypertension gave favorable ratings to the accessibility of telehealth, specifically ability and time to be seen.[40]

Satisfaction with telehealth consultations

Overall, 16 studies (57.1%) explored satisfaction with telehealth consultations. Of these, 9 were quantitative studies,[38,46,49,51,56,59,61,62,64] 5 studies were mixed methods,[37,40,52,54,57] and 2 studies used qualitative methods.[58,63] Results across the 16 studies were mixed, with the majority of studies ($n = 11$, 68.8%) reporting high levels of satisfaction with telehealth among patients, carers, and health professionals.[37,40,46,49,51,56–59,62,63] Patients' reasons for satisfaction with telehealth included increased efficiency and convenience, enhanced privacy, and reduced need for travel compared to in-person face-to-face consultations. Physicians saw improvements in their clients with depression,[58] and carers found the level of rapport with the therapist was as good as in-person visits.[36] Some studies found no discernible differences in levels of satisfaction between telehealth groups and comparison groups (ie, usual care or face-to-face interventions),[52,61,64] and patients in 1 study gave mixed feedback about telepsychiatry.[54] In a study examining telephone triage, patients from ethnic minorities reported higher satisfaction in the GP triage arm compared to usual care but lower satisfaction compared with white patients overall.[38] Thus, the majority of studies found that patients, carers, and providers were satisfied with telehealth consultations.

DISCUSSION

Findings from this systematic review indicate that telehealth for mental health and some physical health conditions between healthcare practitioners and patients from racial/ethnic minorities offer promise across a range of outcomes and healthcare settings and can result in high levels of patient satisfaction. However, it is yet to be determined whether this translates to other healthcare settings, different health conditions, and other racial/ethnic minority populations (particularly in countries outside the United States). Of the 28 included studies, only 2 studies included participants from racial/ethnic minorities and the majority population and reported findings disaggregated by racial/ethnic background. From these 2 studies, it can be ascertained that telehealth did not result in worse outcomes for racial/ethnic minority groups.

Despite the overall positive impact of telehealth consultations for patients from racial/ethnic minority backgrounds, some barriers and challenges were identified by the studies. Technology required to implement telehealth consultations may be problematic for some patients from racial/ethnic minorities because of the cost of equipment, limited understanding of the use of equipment, and limited digital literacy. This concurs with findings from previous reviews of telehealth consultations, including those with Indigenous peoples.[15,16,18,22] Additionally, there may be unique and unanticipated challenges to telehealth consultation delivery for some racial/ethnic communities; for example, some may experience anxiety regarding telecommunication including telehealth because of a perceived risk of fraudulent use of telecommunication or because of their fear of contact from immigration authorities.[52] Any barriers and challenges to use of telehealth are likely to be further exacerbated by factors related to English language proficiency, cultural factors, lack of familiarity with mainstream health systems, and other existing structural

barriers to care (eg, socio-economic conditions, health insurance coverage). This includes awareness of changes in government subsidies related to medical care and advice delivered via telehealth.[65]

Other literature notes that limited English proficiency can be a significant barrier to health service access and utilization for racial/ethnic minorities, including via telehealth consultations. Among the studies[48,51,57] in our review that included refugees, language barriers were not key issues as healthcare providers spoke patients' native languages or interpreters were used. A recent survey by Rodriguez et al[66] found that patients with limited English proficiency had lower rates of telehealth use compared with proficient English speakers. In English-speaking countries, patients with limited English language proficiency may experience substantial difficulties with the use of telehealth and information technology equipment, suggesting that these patients are at greater risk of receiving poorer quality healthcare when engaging in telehealth. Addressing structural (eg, technology and internet broadband) and system (eg, language capabilities and access to support services) barriers to telehealth use will improve the accessibility and equity of health systems and increase engagement among racial/ethnic minority groups and other underserved groups.[67] This is particularly urgent in light of the rapid and widespread shift to telehealth consultations during the COVID-19 pandemic which will likely compound disparities in health outcomes for African Americans in particular.

Furthermore, providing culturally appropriate healthcare is also important for racial/ethnic minorities.[68] In our review, some of the studies included culturally adapted materials in their telehealth consultations and used bilingual staff or interpreters which are likely to have contributed to the overall positive findings across the included studies. The cultural appropriateness and acceptability of telehealth consultations and development of cultural frameworks to guide telehealth use should be considered more broadly, particularly if services are being delivered transnationally.[69,70]

Overcoming barriers and challenges to telehealth should address the need for digital literacy and linguistically appropriate online information. Digital literacy refers to a person's ability to use digital tools (eg, health applications, patient portals, appointment booking) to access, understand, and analyze information and communicate with others.[71,72] Although the use of bilingual staff or interpreters to deliver a telehealth consultation may mitigate some of the challenges experienced by racial/ethnic minorities when using telehealth, patients may still face significant barriers due to poor digital literacy and eHealth literacy skills. E-health literacy is the ability to search, understand, and evaluate health information from electronic sources and apply the knowledge in healthcare contexts.[73] Previous studies suggest low digital literacy to be a contributing factor to racial/ethnic disparities among telehealth users.[74,75]

Limitations of the current evidence-base and areas for further research

This review identified key limitations of existing research. Given the more widespread adoption of telehealth consultations across the health system, it is important to understand its impact for patients from racial/ethnic minority groups to ensure equity of healthcare access and utilization. A recent study of telemedicine use during COVID-19 has already identified disparities in telemedicine access for African American patients compared to white patients.[6] Future research should explore aspects of telehealth technologies and whether additional supports are required to facilitate its use in racial/ethnic minority populations, particularly for those with low digital literacy and language barriers. Additionally, studies could also examine the impacts of telehealth on underserved populations when technology access, supports, and skills are absent.

Further research is required in other areas such as acute and chronic disease management and in other care settings for racial/ethnic minorities such as cancer care, kidney disease, emergency department admissions, critical care, and pediatrics. Studies should also include patients from various racial/ethnic groups to examine whether there are differences in outcomes between racial/ethnic groups within the same healthcare setting. In this review, studies with African American populations are underrepresented relative to other minorities, potentially reflecting a greater focus on issues related to language by existing research. African American populations may experience other unique barriers to telehealth use which could be investigated in future research. In addition, studies should assess the effectiveness of telehealth on minority patients compared with majority patients and whether different barriers and facilitators are experienced by racial/ethnic minorities compared with the majority population. Healthcare organizations should monitor use of telehealth consultations across patient demographics, including language and racial/ethnic background, to measure the impact on health equity. Although our search strategy identified studies conducted in non-English-speaking countries, most studies were based in the United States. Additional studies are required in other countries with underserved populations who may have less access to information technologies and where the structure and function of the healthcare system may present different enabling and constraining factors.

Included studies were also limited by a lack of methodological rigor across most study designs, resulting in a significant gap in the evidence base. The majority of studies did not have a comparison group, and among the few where a comparison group was present, 1 study[38] had a disproportionately larger sample for the white group compared with the "other ethnic" group. Longitudinal studies are needed to determine whether, and to what extent, telehealth consultations affect health-related outcomes over time for racial/ethnic minorities. In particular, the effects of telehealth on early identification of disease and on the long-term management of chronic health conditions are required to maximize long-term health outcomes for racial/ethnic minorities.

Patients from marginalized racial/ethnic minority groups such as refugees were only specifically studied in 3 of the 28 studies.[48,51,57] Issues related to caregiver support and the optimal mode of telehealth consultation delivery (ie, telephone vs. videoconferencing) should also be explored in future research. Additionally, future research should also investigate the impact of social determinants such as residential segregation, economic circumstances, and education on telehealth use.

Limitations of the review

Our review has several limitations. Only articles published in English were included; therefore, there is risk of publication bias. Additionally, the search period of January 1, 2005 to October 9, 2020 may have omitted earlier relevant studies. However, information technology enabling telehealth consultation has evolved considerably since the early 21st century. We anticipate that studies published prior to 2005 would have limited relevance. Our screening and search strategy emphasized "racial and ethnic minorities." This may have excluded studies where efforts were not made to provide inclusive care such as studies which did not include providers who

spoke the first language of racial and ethnic minority patients. This may have influenced the generally positive results identified in the review. Our decision to exclude studies focused on Indigenous peoples may have omitted important studies about racial and ethnic minorities. However, a number of recent reviews of Indigenous peoples and telehealth have been undertaken.[19–22] Additionally, and in agreement with Stanley et al,[23] we argue that Indigenous health requires a specific focus because of the subtle differences in health equity for First Nations peoples.

CONCLUSION

This review has shown telehealth consultations to be mostly positive and beneficial to patients from racial/ethnic minority groups in terms of health outcomes, satisfaction with healthcare, and accessibility of health services. Telehealth delivered to patients in their preferred language or by bilingual health providers contributed to positive outcomes. Challenges to implementation of telehealth consultations across racial/ethnic minority populations were also identified and should be considered in the development and implementation of guidelines, policies, and practices in relation to the use of telehealth across the healthcare system. Further research is needed to understand the long-term impacts of telehealth use to ensure health disparities are not worsened.

AUTHOR CONTRIBUTIONS

All authors contributed to the study conception and design. MT and OC developed the protocol and search strategy with input from LY. All authors contributed to study screening and selection, data extraction, and quality assessment. Data synthesis was conducted by MT, LY, PW, KC, and JA. MT led the writing of the manuscript, with contributions from all coauthors. All authors reviewed and approved the final manuscript.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Journal of the American Medical Informatics Association* online.

CONFLICTS OF INTEREST STATEMENT

None declared.

DATA AVAILABILITY

The data underlying this article are available in the article and in its online supplementary material.

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