# Quality of interactions between health workers and women, parents, caregivers and families using digital health technologies for maternal, newborn and child health: a scoping review

DRAFT protocol. V3

27 October 2023

# Background

During the COVID-19 pandemic, the World Health Organization (WHO) Department of Maternal, Newborn, Child and Adolescent Health and Ageing (WHO/MCA) worked with WHO regional and country offices to support 19 countries in mitigating the effects of COVID-19 on maternal, newborn, and child health (MNCH) service provision and use. Through this initiative, strategies undertaken by countries to ensure continuity of MNCH services were documented. A strategy reported by nearly all countries was the development, adaptation and use of digital health technologies for various purposes, including consultations and interpersonal communication. A frequently reported concern from country programmes was that while digital health rapidly expanded, little information was available to measure how these tools were impacting the quality and experience of interactions between clients and health workers. Many reports speculated that virtual encounters were less interactive and focused on message giving.

In conceptualising the quality and experience of digital health interactions, it is useful to refer to the WHO Quality of Care framework that includes experience of care, which consists of effective communication, respect and preservation of dignity and emotional support (Tunçalp 2015; WHO, 2016). Effective communication involves women and families receiving information about the care and feeling involved in all decisions taken about treatment, and effective interaction between health worker and the client can help reduce anxiety, improve understanding and expectations for care, and ensure a positive experience. These are important elements in in-person interactions between health workers and women, parents, caregivers and families, but it is less clear whether they have been effectively adapted and included as standards for digital health interactions in MNCH.

The importance of effective interaction between health workers and clients, and of health workers having interpersonal communication skills, counseling skills and cultural competence is acknowledged in the wider quality of care literature (Gilligan 2023; Ovretveit 1992), and the positive impacts are known (Hulton 2000). Research on health worker-client interactions gained momentum in the 1980’s, as a key component of situation analysis methodology for assessing quality of health services, particularly for family planning provision (Askew 1994; Jain 1992; Simmons 1994). The tools and checklists developed at that time, for evaluating client-provider interactions and interpersonal communication, may contain useful domains or criteria for evaluating the quality of digital health interactions. Similarly, frameworks and models of interpersonal communication in medical encounters (Makoul 2001) contain domains such as building a relationship, sharing information, understanding the patient’s perspective and shared decision making, that could be adapted for the purpose of assessing the quality of digital interactions between health workers and clients in MNCH.

Use of digital technology for health is a rapidly expanding, and countries have access to a range of digital health tools including health applications on mobile, tablet and other wireless devices (mHealth) and eHealth (e.g. services supported by digital or electronic processes including telemedicine, electronic health records, healthcare information systems) (Ames 2019). In the last 10 years, evaluations of both mHealth and eHealth interventions in MNCH have mainly focused on functionality and technical features, feasibility and implementation challenges, user experiences and acceptability, effectiveness and cost effectiveness (Bartlett 2021; Reynolds-Wright 2021). More recent research, especially during the COVID-19 pandemic, has focused on use of mHealth applications for improving access to and uptake of RMNCH services (Odendaal 2020; Narla 2020; Aung 2020), and use of telehealth by health workers to communicate with women, families and caregivers and to conduct virtual consultations (ref). Again, the focus has tended to be on feasibility, useability, effectiveness and safety of telehealth interventions, rather than assessing the quality and experience of the interaction, including interpersonal communication.

While research on the quality and experience of interactions using digital technology is lacking in the health sector, there may be important insights within other sectors where use of digital technology is also rapidly expanding. For example, digital technology has been used progressively in the education sector since the 1980s to enhance learning and teaching, improve access to education resources, offer massive open online courses (e.g. Coursera, EdX and Udacity), and most recently for remote learning during the COVID-19 pandemic (Facer 2021). There is a body of literature assessing the quality of learning experiences associated with digital tools, especially efficiency, effectiveness and enjoyment (Alyami 2022) and subjective experiences and expectations of learners using videoconferencing learning environments (Correla 2020). This literature contains examples of checklists or criteria for assessing the quality of virtual, online, or remote learning environments and the quality of communication and interaction between students and teachers (Hafeez 2022) that could be adapted for assessing digital interactions in MNCH. Similarly, the use of digital tools and approaches is accelerating in the humanitarian sector (Bryant 2022a), particularly to address challenges during the COVID-19 pandemic (Bryant 2022b). Mobile and social media apps and geographical mapping platforms have been used to continue distributing relief and providing services, digital tools and social media to disseminate public health messages, and mHealth interventions to improve health service access for displaced and vulnerable populations (Narla 2020). There could be valuable learning on the quality and experience of these digital health adaptations, especially those involving virtual consultations or interactions with health and other humanitarian workers, that is transferable to digital interactions in MNCH.

As digital health technologies become more commonly used, it is critical to support Ministries of Health in assessing the use of these technologies. Evidence is currently lacking on best practices for digital health interventions in MNCH (Ames 2019), especially criteria and standards for assessing the quality of interactions, and more broadly indicators for assessing the impact of these technologies on service delivery, people-centred care, and improvements to health, equity and gender equality (Ames 2019). While different evaluation instruments exist to measure the use of digital health technologies, WHO/MCA is particularly interested in focusing on the quality of digital health interactions between health workers and women/parents/caregivers/families in the context of person-centred universal health care.

## Why is a scoping review needed?

WHO/MCA has been working to develop a tool to assess the quality of digital interactions between health workers and women/parents/caregivers/families for improved MNCH, including reviewing existing guidance and publications, consulting with experts in MNCH and digital health, and formulating the elements of an initial draft tool.

A consultation meeting was held in Geneva in April 2023 to review initial concepts and configurations for the draft tool with digital and MNCH experts, where it was also agreed that such a tool could potentially be more user-friendly and easier to implement in a digital or web-based format. Prior to the meeting an initial desk review was conducted to map the current literature relating to health worker and client experience of digital health technologies, which informed the initial concepts and the discussion. One of the next steps identified at the meeting was to conduct a formal scoping review of the most recent peer-reviewed literature, expanding the inclusion criteria to include other health fields and potentially other sectors.

This scoping review will be expansive to maximize the learning about the quality and experience of both in-person health worker-client interactions, and in interactions using digital technology. It will include evidence from the health and education sectors. The review will identify from the retrieved literature, criteria, methods, tools, checklists or standards and research or evaluation specifically related to assessing the quality of interactions using digital health technologies. The findings can be used to: a) develop a list of criteria for quality digital interactions between health workers and women, families and caregivers; and b) through a subsequent process of consensus and prioritization, identify criteria to be included in an assessment tool for MNCH.

# Review question, aim and objectives

## Question

What is known from the available peer-reviewed literature about the quality and experience of interactions using digital health technology, to inform the development of a quality assessment tool for digital technology in MNCH

## Aim

To map and summarize the literature on the quality of interactions using digital technology in health (FP, MNCH, PMTCT) and in education, and identify criteria, tools, methods, checklists or standards for assessing quality of interactions, in order to inform next steps and support the development of a tool to assess the quality of health worker-client interactions using digital technology for MNCH.

## Objectives

1. To identify published literature on the quality and experience of **in-person health worker-client interaction** in FP, MNCH and PMTCT counselling
2. To identify published literature on the quality and experience of **health worker-client interactions using digital health technology** in FP, MNCH and PMTCT counselling
3. To identify published literature on the quality and experience of **interactions using digital technology in the education sector**
4. To use the retrieved literature to identify methods, tools, checklists or standards and research or evaluation specifically related to interaction and interpersonal communication using digital health technologies.

# Methods

## Inclusion and exclusion criteria

Box 1 lists inclusion and exclusion criteria we will use to determine the documents to be included in the review relevant to objective 1 of the scoping review. The focus here is on the quality and experience of in-person health worker-client interactions. Box 2 lists inclusion criteria relevant to objective 2, where the focus is on the quality and experience of health worker-client interactions using digital health technology. Finally, box 3 lists inclusion criteria for objective 3, which is focused retrieving literature on the quality and experience of interactions using digital technology from the education sector.

Box 1. Scoping review inclusion and exclusion criteria for objective 1.

|  |  |  |
| --- | --- | --- |
|  | **Inclusion criteria** | **Exclusion criteria** |
| Participants | Women, mothers, newborns, baby, infant, child, and parents, caregivers, family members Health personnel, healthcare personnel, health provider, health worker, health professional, health staff, health workforce  | All other participant groups  |
| Intervention | In-person interpersonal communication, communication, interaction, health worker-client interaction  | Digital interactions (i.e. this objective is focused in in person interactions only) |
| Field | Family planning Maternal, newborn, child health (MNCH)HIV-related counselling including Prevention of Mother to Child Transmission (PMTCT) counselling  | All other health fields  |
| Context | Global – literature from any country  |  |
| Outcomes | Research or evaluations on the quality or experience of health worker-client interactionsCriteria, method, checklist, tool, or standard for assessing the quality of interactions, communication or interpersonal communication Perspectives of women, partners, caregivers or health workers on the quality or experience of in-person interactions | Checklists, tools, standards or assessments for establishing or evaluating the effectiveness of digital health technologies  |
| Type of document | Published peer reviewed literature including evaluations and research using all study designs; commentaries and opinion pieces  | Unpublished technical reports, dissertations, policy documents, guidelines  |
| Language | No language restrictions.  | If a number of non-English publications are found, WHO staff will determine if assistance with translation is required |
| Date limits | From 1980 onwards when situation analysis methods including checklists for assessing client-provider interaction began to appear | Before 1980 |

Box 2. Inclusion and exclusion criteria for objective 2.

|  |  |  |
| --- | --- | --- |
|  | **Inclusion criteria** | **Exclusion criteria** |
| Participants | Women, mothers, newborns, baby, infant, child, and parents, caregivers, family members Health personnel, healthcare personnel, health provider, health worker, health professional, health staff, health workforce   | All other participant groups  |
| Intervention | Interpersonal communication, communication, interaction, health worker-client interaction using digital health technology (e.g. eHealth, telemedicine, videoconferencing, mHealth)  | In-person interactions; just video without interaction (or passive information giving) |
| Field | Family planning Maternal, newborn, child health (MNCH)HIV-related counselling including Prevention of Mother to Child Transmission (PMTCT) counselling  | All other health fields  |
| Context | Global – literature from any country  |  |
| Outcomes | Research or evaluations on the quality or experience of health worker-client interactionsCriteria, method, checklist, tool, or standard for assessing the quality of interactions, communication or interpersonal communication using digital health technologiesPerspectives of women, partners, caregivers or health workers on the quality or experience of digital health interactions | Checklists, tools, standards or assessments for establishing or evaluating the effectiveness of digital health technologies  |
| Type of document | Published peer reviewed literature including evaluations and research using all study designs; commentaries and opinion pieces  | Unpublished technical reports, dissertations, policy documents, guidelines  |
| Language | No language restrictions.  | If a number of non-English publications are found, WHO staff will determine if assistance with translation is required |
| Date limits | From 2010 onwards when digital interventions in MNCH started to appear in the literature  | Before 2010 |

Box 3. Scoping review inclusion and exclusion criteria for objective 3.

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| --- | --- | --- |
|  | **Inclusion criteria** | **Exclusion criteria** |
| Participants | Student, pupil, learner, freshman, sophomore, graduate, alumni, post-graduateEducator, teacher, instructor, lecturer, professor | Other participant groups, students enrolled in in-person school/ university-based learning  |
| Intervention | Interpersonal communication, communication, interaction using digital technology in education, e.g.Learning management systems (Moodle, BlackBoard, Google Classroom)Learning approach (virtual learning environment (VLE), online education platform, virtual learning platform, e-learning, virtual classroom, remote learning, distance learning)Online course platforms (massive open online course (MOOC), Coursera, edX, Udacity, Khan Academy, LinkedIn learning Videoconferencing and webinar tools for digital learning (Zoom, Microsoft Teams, Google Meet, Cisco WebEx, Adobe Connect for virtual classrooms, webinars, and online meetings) | Non-virtual/digital education technologies, in-person interactions, communication between student and educator; just video without interaction (or passive information giving) |
| Field | Education - online modality that would implicitly involve the visual presence of an educator | Education that involves in-person interactions, communication between student and educator |
| Context | Global |  |
| Outcomes | Research or evaluation on the quality of student-educator interactionsCriteria, method, checklist, tool, or standard for assessing the quality of interactions, communication or interpersonal communicationPerspectives of educators or students on the quality or experience of digital health interactions |  |
| Type of document | Published peer reviewed literature including research and evaluations; commentaries and opinion pieces |  |
| Language | No language restrictions.  | If a number of non-English publications are found, WHO staff will determine if assistance with translation is required |
| Date limits | From 2012 onwards, when online course platforms (e.g. Coursera, edX, Udacity) were founded  | Before 2012 |

## Search strategy

### Literature search

We will follow the Johanna Briggs Institute (JBI) recommended standard approach for scoping reviews to locate published research and other literature (Peters, 2017). First, we will list terms and synonyms relevant to each of the inclusion criteria, have these reviewed by WHO information specialist, who specializes in in-depth searching for systematic reviews and other evidence synthesis, and perform an initial search of a couple of relevant databases (e.g. PubMed and Global Index Medicus). We will analyse the text words used in retrieved article titles and abstracts, then conduct a comprehensive search of all relevant databases using all identified key words and index terms. The third step will involve searching all reference lists of retrieved reports and articles to identify additional literature.

We will run separate searches for objectives 1-3. Based on advice from the WHO information specialist, for the purpose of a scoping review PubMed is considered comprehensive enough, and searching a second databases should be sufficient to ensure nothing of relevance is missed. For objectives 1 and 2, concerning the health sector, we will search PubMed and then run a second search in Global Index Medicus to ensure we do not miss any relevant research from low- and middle- income countries. For objective 3, focused on digital technology in the education sector, we will search PubMed and then ERIC (an online database of education research). The searches will be limited first to search terms for the intervention (interaction or communication or interpersonal communication) combined with keywords for the outcomes (criteria or methods or tools or checklists or standards) and key terms for the specific fields (Family planning or Maternal, newborn, child health (MNCH) or HIV-related counselling including Prevention of Mother to Child Transmission (PMTCT) counselling or education). If the searches yield too many or too few relevant hits, then search terms for participants relevant to each objective will be integrated into the search. See Annex 1 for draft search strategies for each objective.

We will supplement the separate searches with a Google Scholar search using keywords relating to the intervention combined with keywords for the outcomes and key terms for the specific fields. In addition, we will review the list of included studies in a related review on maintaining essential services for maternal, newborn, child and adolescent health during the COVID-19 pandemic, to ensure we do not miss important studies from the health sector (including humanitarian contexts) (WHO, 2021). We will also include terms for the ten attributes of quality interactions - people-centred care, communications, outcome-oriented, equity and access, confidence and motivation, safety and privacy, sentiment, time, environment and infrastructure, feedback and oversight – established during consultations with expert group prior to the Geneva meeting in April 2023.

## Screening and selection

We will use the Covidence web-based platform to facilitate the screening and selection process for this scoping review; we will proceed with screening, selection and data extraction for each objective sequentially. We will also create a Zotero database of all articles retrieved from the database, reference list, and Google scholar searches, with separate folders for articles relating to objectives 1-3. For each objective, one author will screen the titles and abstracts of all records; a second author from the WHO team will independently screen 20% of the records. This will be followed by assessment of relevant full text documents/papers and selection against the inclusion criteria; one author will conduct the eligibility assessment, and another from the WHO team will independently assess 20% of full texts. We will compare results and resolve discrepancies by discussion and returning to the papers. At the full text screening, we will record reasons for exclusion.

Screening and selection decisions will be documented in a PRISMA flow chart, which will include (for each separate search): search results, number of duplicates removed, number of reports/articles screened, and number excluded, number of full text articles/reports assessed for eligibility and number excluded (with reasons), number of documents retrieved from reference lists, and final number of documents included in the scoping review.

## Quality assessment

Quality assessment is generally not performed in scoping reviews where the purpose is to provide an overview of the existing literature regardless of quality (Peters, 2015).

## Data extraction

Using a pre-defined data extraction table in MS Excel, we will extract key information from all included documents. Again, this will be done sequentially by objective in Covidence. We will pilot the data extraction form on 4-5 articles to ensure it is fit for purpose and all fields are relevant before importing it for use in Covidence. Box 4 lists potential data extraction fields to capture. Extraction of document characteristics and relevant findings will be performed by one author, with independent review by a member of the WHO team.

Box 4. Potential data extraction fields

|  |  |
| --- | --- |
| **Characteristics of included articles**  | 1. Author
2. Year of publication
3. Country of origin
4. Aim or purpose
5. Study design
6. Area of intervention (e.g. In-person interpersonal communication, communication, interaction, health worker-client interaction; Interpersonal communication, communication, interaction, health worker-client interaction using digital health technology; Interpersonal communication, communication, interaction using digital technology in education)
7. Field and subfield (e.g health/family planning; health/MNCH; health/PMTCT; education)
 |
| **Findings relating to the review question**  | 1. Description of research or evaluation on the quality of health worker-client interactions (in-person and using digital health technology) and in student-educator interactions using digital technology – including key outcomes
2. Description and key elements of criteria, methods, checklists, tools, or standards for assessing the quality of interactions, communication or interpersonal communication (in-person, using digital health technology and in education)
3. Other findings of interest including any qualitative research on perspectives of women, partners, caregivers or health workers on the quality or experience of digital health interactions
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# Summarising and reporting the results

We will present the characteristics of included studies, followed by a table describing research or evaluations on the quality of health worker-client interactions (in-person and using digital health technology) and in student-educator interactions using digital technology. Another table will summarise any criteria, methods, checklists, tools or standards found within the included articles, for assessing the quality of interactions (in-person, using digital health technology and in digital interactions in education). This output will help generate a list of criteria that can be used to assess digital interactions between health workers, women, families and caregivers for MNCH, and inform next steps in developing an assessment tool. If through the scoping review we identify any qualitative research on perspectives of women, partners, caregivers or health workers on the quality or experience of digital health interactions, we will summarise the studies and key findings, to help determine whether an additional qualitative evidence synthesis is warranted or useful.

Reporting, write-up, and any publication generated from the scoping review will follow the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) format (Tricco, 2018).

# Timeline

|  |  |
| --- | --- |
| **Key tasks /** **deliverables (in bold)** | Complete by (2023) |
| *Develop workplan, methods guide and register protocol* |
| Draft workplan and methods guide | 8 September |
| WHO expert group to review and feedback  | 9 October |
| **Revise and finalise workplan and methods guide; register protocol** | 23 October |
| *Searching screening, selection of papers* |
| - Create draft search strategy, send to WHO info specialist for review | 26 September |
| - Discussion with WHO information specialist  | 6 October |
| - Conduct database searches  | 23-31 October  |
| - Compile Mendeley/Zotero database- Pilot data extraction table and import to Covidence | 31 October |
| Set up Covidence for objective 1 - screen abstracts/titles (including sample by WHO team)- retrieve and assess full texts- extract and summarise data form included articles | 1-3 November (Anthrologica retreat)13-17 November |
| Set up Covidence for objective 2- screen abstracts/titles (including sample by WHO team)- retrieve and assess full texts- extract and summarise data form included articles | (Soha travel)4-15 December |
| Set up Covidence for objective 3- screen abstracts/titles (including sample by WHO team)- retrieve and assess full texts- extract and summarise data form included articles | 18-22 December(Christmas break)8-12 January 2024 |
| *Draft initial summary for findings for discussion/presentation*  |
| - Collate findings tables across all 3 objectives and draft results - Anthrologica internal review and edit of draft report | 15-19 January22-23 January  |
| **Send draft report of initial findings to WHO team/expert group**  | 24 January  |
| - Receive WHO review and feedback | 2 February  |
| **Meeting and presentation (date TBC)** | w/c 12 Feb |
| **Submit final report and draft manuscript to WHO team** | 1 March  |

\*Soha unavailable in weeks of 9 October, 20, 27 Nov; Helen and Soha unavailable week of 6 November.

# References

Ames HMR, Glenton C, Lewin S, Tamrat T, Akama E, Leon N. Clients’ perceptions and experiences of targeted digital communication accessible via mobile devices for reproductive, maternal, newborn, child, and adolescent health: a qualitative evidence synthesis. Cochrane Database of Systematic Reviews 2019, Issue 10. Art. No.: CD013447.

Askew, Ian, Barbara Mensch, and Alfred Adewuyi. “Indicators for Measuring the Quality of Family Planning Services in Nigeria.” *Studies in Family Planning* 25, no. 5 (1994): 268–83. <https://doi.org/10.2307/2138058>

Aung B, Mitchell JW, Braun KL. Effectiveness of mHealth interventions for improving contraceptive use in low- and middle-income countries: a systematic review. Glob Health Sci Pract. 2020;8(4):813-826

Bartlett L, Avery L, Ponnappan P*, et al*. Insights into the design, development and implementation of a novel digital health tool for skilled birth attendants to support quality maternity care in Kenya. *Family Medicine and Community Health*2021;**9:**e000845

Bryant, J. (2022a) *Digital technologies and inclusion in humanitarian response*. HPG report. London: ODI (www.odi.org/en/publications/igital-technologies-and-inclusion-in- humanitarian-response).

Bryant J, Holloway K, Lough O, Willits-King B. (2022b). Bridging humanitarian digital divides during COVID-19. HPG Briefing Note. London: ODI (<https://www.humanitarianlibrary.org/sites/default/files/2021/10/Bridging_humanitarian_digital_divides_during_Covid-19.pdf>)

Ana-Paula Correia, Chenxi Liu & Fan Xu (2020) Evaluating videoconferencing systems for the quality of the educational experience, Distance Education, 41:4, 429-452, DOI: [10.1080/01587919.2020.1821607](https://doi.org/10.1080/01587919.2020.1821607)

Facer, K. and Selwyn, N. 2021. Digital technology and the futures of education –towards ‘non-stupid’ optimism. Paper commissioned for the UNESCO Futures of Education report (forthcoming, 2021).

Gilligan C, Powell M, Lynagh MC, Ward BM, Lonsdale C, Harvey P, James EL, Rich D, Dewi SP, Nepal S, Croft HA, Silverman J. Interventions for improving medical students' interpersonal communication in medical consultations. Cochrane Database of Systematic Reviews 2021, Issue 2. Art. No.: CD012418.

Hafeez, M., Naureen, S., and Sultan, S., 2022.Quality Indicators and Models for Online Learning Quality Assurance in Higher Education. The Electronic Journal of e-Learning, 20(4), pp. 374-385, available online at [www.ejel.org](http://www.ejel.org)

Hartley P. *Interpersonal Communication*. 2nd edition. New York, NY: Routledge (Taylor and Francis), 1999.

Herrington, A. J., Herrington, J. A., Oliver, R. G., Stoney, S. B., & Willis, J. A. (2001). Quality guidelines for online courses: the development of an instrument to audit online units. Proceedings of 18th Conference of the Australasian Society for Computers in Learning in Tertiary Education. (pp. 263-270). Melbourne, VIC. Biomedical Multimedia.

Hulton L, Matthews Z, Stones RW. A framework for the evaluation of quality of care in maternity services. Southampton: University of Southampton; 2000.

Jain, Anrudh, Judith Bruce, and Barbara Mensch. “Setting Standards of Quality in Family Planning Programs.” Studies in Family Planning 23, no. 6 (1992): 392–95. https://doi.org/10.2307/1966897.

Makoul G. Essential elements of communication in medical encounters: the Kalamazoo consensus statement. Acad Med. 2001 Apr;76(4):390-3.

Narla NP, Surmeli A, Kivlehan SM. Agile Application of Digital Health Interventions during the COVID-19 Refugee Response. Ann Glob Health. 2020 Oct 15;86(1):135. doi: 10.5334/aogh.2995.

Odendaal WA, Anstey Watkins J, Leon N, Goudge J, Griffiths F, Tomlinson M, Daniels K. Health workers’ perceptions and experiences of using mHealth technologies to deliver primary healthcare services: a qualitative evidence synthesis. Cochrane Database of Systematic Reviews 2020, Issue 3. Art. No.: CD011942.

Ovretveit J, Bate P, Cleary P, Cretin S, Gustafson D, McInnes K, et al. Health service quality. An introduction to quality methods for health services. Oxford: Blackwell Scientific Publications; 1992.

Peters MD, Godfrey CM, Khalil H, McInerney P, Parker D, Soares CB. Guidance for conducting systematic scoping reviews. Int J Evid Based Healthc. 2015;13:141-6

Peters MD, Godfrey C, McInerney P, Baldini Soares C, Khalil H, Parker D. Scoping reviews. In: Aromataris E, Munn Z, eds. Joanna Briggs Institute Reviewer's Manual. Adelaide, Australia: Joanna Briggs Inst; 2017.

Reynolds-Wright JJ, Johnstone A, McCabe K*, et al*. Telemedicine medical abortion at home under 12 weeks’ gestation: a prospective observational cohort study during the COVID-19 pandemic. *BMJ Sexual & Reproductive Health*2021;**47:**246-251.

Simmons, Ruth, and Christopher Elias. “The Study of Client-Provider Interactions: A Review of Methodological Issues.” Studies in Family Planning 25, no. 1 (1994): 1–17. <https://doi.org/10.2307/2137985>.

Tricco AC, Lillie E, Zarin W, O’Brien KK, Colquhoun HL, Levac D, Moher D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Ann Intern Med. 2018;169:467-473.

Tunçalp Ӧ, Were WM, MacLennan C, Oladapo OT, Gülmezoglu AM, Bahl R, Daelmans B, Mathai M, Say L, Kristensen F, Temmerman M, Bustreo F. Quality of care for pregnant women and newborns-the WHO vision. BJOG. 2015 Jul;122(8):1045-9. doi: 10.1111/1471-0528.13451.

World Health Organization. Standards for improving quality of maternal and newborn care in facilities. World Hearth Organization; 2016. <https://www.who.int/publications/i/item/9789241511216>

World Health Organization. Maintaining the provision and use of services for maternal, newborn, child and adolescent health and older people during the COVID-19 pandemic: lessons learned from 19 countries. World Health Organization; 2021. <https://iris.who.int/handle/10665/351108>.

# Annex 1. Example search strategies

|  |  |
| --- | --- |
| **Search string**  | Objective 1: To identify published literature on the quality and experience of **in-person health worker-client interaction** in FP, MNCH and HIV-related counselling including PMTCT counselling**(Search strategy for Pubmed)** |
| #1 | Women [mh] OR mothers [mh] OR patient [mh]  |
| #2 | Newborn [mh] OR infant [mh] OR infant, newborn [mh] OR child [mh] OR [baby] |
| #3 | Caregiver OR family [mh] OR partner [mh] OR spouses [mh] OR parent [mh] |
| #4 | #1 OR #2 OR #3 |
| #5 | Health Personnel [tiab] OR healthcare personnel [tiab] OR health provider\* [tiab] OR healthcare provider\* [tiab] OR health worker\* [tiab] OR healthcare worker\* [tiab] OR health professional\* [tiab] OR healthcare professional\* [tiab] OR health staff [tiab] OR healthcare staff [tiab] OR health workforce [tiab]  |
| #6 | Maternity [tiab] OR maternal [mh] OR maternal-child health centres [tiab] OR maternal health services [mh] OR child health services [mh] OR maternal-child nursing [mh] OR family planning services [mh] OR HIV counselling [mh] OR PMTCT counselling [mh] OR prevention mother to child transmission counselling [mh] |
| #7 | Interaction [tiab] OR interpersonal relation\* [mh] OR interpersonal relation\* [tiab] OR interpersonal communication [tiab] OR communication [mh] OR communication [tiab] OR experience\* [tiab] client-provider interaction [tiab] OR quality [tiab] OR perception [mh] OR patient satisfaction [mh] OR person-centered [tiab] OR person-centred [tiab] |
| #8 | criteria [tiab] OR checklist [tiab] OR tool [tiab] OR standard [tiab] OR framework [tiab] OR instrument [tiab] OR method [tiab] OR assess\* [tiab] OR approach [tiab]  |
| #9 | #6 AND #7 AND #8 |
| #10 | #9 AND #5 (if the searches do not yield expected results) |
| #12 | Publication year limit 1980s |

|  |  |
| --- | --- |
| **Search string**  | Objective 2: To identify published literature on the quality and experience of health worker-client interactions **using digital health technology** in FP, MNCH and HIV-related counselling including PMTCT counselling**(Search strategy for Pubmed)** |
| #1 | Women [mh] OR mothers [mh] OR patient [mh] |
| #2 | Newborn [mh] OR infant [mh] OR infant, newborn [mh] OR child [mh] OR baby [mh] |
| #3 | Caregivers OR family [mh] OR partners [tiab] OR spouses [mh] OR parents [mh] |
| #4 | #1 OR #2 OR #3 |
| #5 | Health Personnel [tiab] OR healthcare personnel [tiab] OR health provider\* [tiab] OR healthcare provider\* [tiab] OR health worker\* [tiab] OR healthcare worker\* [tiab] OR health professional\* [tiab] OR healthcare professional\* [tiab] OR health staff [tiab] OR healthcare staff [tiab] OR health workforce [tiab] |
| #6 | Maternity [tiab] OR maternal [mh] OR maternal-child health centres [tiab] OR maternal health services [mh] OR child health services [mh] OR maternal-child nursing [mh] OR family planning services [mh] OR HIV counselling [mh] OR PMTCT counselling [mh] OR prevention mother child transmission counselling [mh] |
| #7 | Digit health [tiab] OR Digital Health [tiab] OR Telemedicine [mh] OR telemedicine [tiab] OR tele-medicine [tiab] OR e-health [tiab] OR m-health [tiab] OR mhealth [tiab] OR virtual medicine [tiab] OR virtual health [tiab]  |
| #8 | Interaction [tiab] OR interpersonal relation\* [mh] OR interpersonal relation\* [tiab] OR interpersonal communication [tiab] OR communication [mh] OR communication [tiab] OR OR experience\* [tiab] OR client-provider interaction [tiab] OR quality [tiab] OR perception [mh] OR patient satisfaction [mh] OR person-centered [tiab] OR person-centred [tiab]  |
| #9 | criteria [tiab] OR checklist [tiab] OR tool [tiab] OR standard [tiab] OR framework [tiab] OR instrument [tiab] OR method [tiab] OR assess\* [tiab] OR approach [tiab] |
| #10 | #7 AND #8 AND #9 |
| #11 | #10 AND #6 (with MNCH – optional – if needed) |
| #12 | #11 AND #4 (if the searches do not yield expected results) |
| #13 | #11 AND #5 (if the searches do not yield expected results) |
| #14 | #10 AND #5 |
| #15 | Publication year limit 2010 |

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| --- | --- |
| **Search string**  | Objective 3: To identify published literature on the quality and experience of **interactions using digital technology in other sectors** (e.g. education)**(Search strategy for Pubmed)** |
| #1 | Students [mh] OR minors [mh] OR students [tiab], Freshman [tiab] OR students, Sophomore [tiab] OR students, Graduate [tiab] OR alumni [tiab] OR Alumnae [tiab] OR education, graduate [mh] OR learner [tiab] |
| #2 | Educator\* [tiab] OR educational [tiab] OR teacher\* [mh] OR teacher [tiab] OR instructor\* [tiab] OR lecturer\* [tiab] OR teaching faculty [mh] OR education [mh] OR learning [mh] OR teaching [mh] |
| #3 |  #1 OR #2 |
| #4 | Virtual learning [tiab] OR virtual learning environment [tiab] OR virtual encounter\* [tiab] OR digital learning [tiab] OR digital interaction\* [tiab] OR digital technology for education [tiab] OR digital education tool\* [tiab] OR online course [tiab] OR e-learning [tiab] OR virtual classroom [tiab] OR remote learning [tiab] OR distance learning [tiab] OR videoconferencing [tiab] OR webinar\* [tiab] OR user-computer interface [mh] OR user-computer interface [tiab] |
| #5 | Interaction [tiab] OR interpersonal relation\* [mh] OR interpersonal relation\* [tiab] OR interpersonal communication [tiab] OR communication [mh] OR communication [tiab] OR experience\* [tiab] OR quality [tiab] OR perception [mh] OR satisfaction [mh] OR person-centered [tiab] OR person-centred [tiab] |
| #6 | criteria [tiab] OR checklist [tiab] OR tool [tiab] OR standard [tiab] OR framework [tiab] OR instrument [tiab] OR method [tiab] OR assess\* [tiab] OR approach [tiab] |
| #7 | #4 AND #5 AND #6 |
| #8 | #7 AND #3 (if needed) |
| #9 | Publication year limit 2012 |