Mapping the healthcare skills pack: a systematic scoping review and qualitative content analysis (1993–2023).

Mapeo del conjunto de competencias en atención sanitaria: una revisión sistemática de alcance y un análisis cualitativo de contenido (1993–2023).

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Abstract: Professional, clinical, and teaching practice in healthcare are interconnected and depend on a broad set of skills. This study maps how "skills" are reported in the literature to support curriculum development and identify gaps relevant to current and future challenges, including technological transformation and artificial intelligence (AI). A systematic scoping review with qualitative content analysis was conducted to identify and categorize healthcare-related skills reported between 1993 and 2023. Searches were performed in PubMed and Google Scholar using educator-/education-focused long-tail keywords. Records were deduplicated and screened, and eligible full texts were coded in MAXQDA using a codebook-guided approach. A free-full-text-or-next feasibility criterion was applied to ensure consistent full-text access for qualitative coding. All coding was performed by the author. Results are reported at the code level (N = 1024), with each skill counted at most once per manuscript. A total of 168 manuscripts were included (the included corpus spans 1995–2023, as no eligible manuscripts were retrieved for 1993–1994). Across the corpus, 1024 skill codes were generated and grouped into nine areas: Clinical/Medical (25.87%), Teaching and Learning (24.21%), Communication (16.60%), Emotional (9.27%), Interpersonal (8.59%), Psychomotor (6.25%), Management (4.68%), Analytical (2.34%), and Leadership (2.14%). At the individual-skill level, the healthcare "skills pack" was concentrated in 21 core skills, accounting for 70.11% of all coded data; the most prevalent were clinical, communication, technical, and teaching skills. Skills explicitly related to emerging domains such as AI and advanced digital health were comparatively underrepresented. Overall, the literature emphasizes Clinical/Medical, Teaching and Learning, and Communication domains, with a marked concentration in a limited set of core skills, indicating the need to strengthen and update skill sets to address evolving technological and AI-related demands.

Keywords: Medical education, Professional Development, Healthcare workers, Skills development.

Resumen: La práctica profesional, clínica y docente en el ámbito sanitario está interconectada y depende de un amplio conjunto de competencias. Este estudio mapea cómo se describen las "competencias" (skills) en la literatura para apoyar el desarrollo curricular e identificar brechas relevantes para los retos actuales y futuros, incluida la transformación tecnológica y la inteligencia artificial (IA). Se realizó una revisión sistemática de alcance (scoping review) con análisis cualitativo de contenido para identificar y categorizar competencias relacionadas con la salud publicadas entre 1993 y 2023. Las búsquedas se efectuaron en PubMed y Google Scholar utilizando términos long-tail centrados en educadores/educación. Los registros se desduplicaron y cribaron, y los textos completos elegibles se codificaron en MAXQDA mediante un enfoque guiado por un codebook. Se aplicó un criterio de factibilidad free-full-text-or-next para garantizar un acceso homogéneo al texto completo para la codificación cualitativa. Toda la codificación fue realizada por el autor. Los

resultados se informan a nivel de códigos (N = 1024), contabilizando cada competencia como máximo una vez por manuscrito. Se incluyeron 168 manuscritos (el corpus incluido abarca 1995–2023, ya que no se recuperaron manuscritos elegibles para 1993–1994). En total se generaron 1024 códigos de competencias, agrupados en nueve áreas: Clínica/Médica (25,87%), Enseñanza y Aprendizaje (24,21%), Comunicación (16,60%), Emocional (9,27%), Interpersonal (8,59%), Psicomotora (6,25%), Gestión (4,68%), Analítica (2,34%) y Liderazgo (2,14%). A nivel de competencias individuales, el "paquete de competencias" se concentró en 21 competencias nucleares, que representan el 70,11% de todos los datos codificados; las más prevalentes fueron las competencias clínicas, de comunicación, técnicas y docentes. Las competencias explícitamente relacionadas con dominios emergentes como la IA y la salud digital avanzada estuvieron relativamente infrarrepresentadas. En conjunto, la literatura enfatiza las áreas Clínica/Médica, Enseñanza y Aprendizaje y Comunicación, con una marcada concentración en un conjunto limitado de competencias nucleares, lo que sugiere la necesidad de reforzar y actualizar las competencias para responder a las demandas tecnológicas y relacionadas con la IA en evolución.

1. Introduction

The application of skills and their development are fundamental for the practice of healthcare professions, from training/education to professional practice. Skills evolve and change over time, adapting to new professional practice methodologies, new technologies, and the requests and needs of patients and communities. A skill can be defined as the ability to apply knowledge and competence effectively, efficiently, and promptly to a situation or task. Skills can be classified as follows:

- Microskills (Ms): can be considered the single founding unit of a skill (1). Microskills are usually focused and specific with respect to a task, an action, a situation (for example: writing quickly, data entry accuracy, visual perception).
- Cognitive skills (Cs): are related to mental processes and the acquisition of new skills, knowledge, and processes of adaptation and/or resolution of situations/tasks (2) (for example: problem-solving, decision-making, logical reasoning).
- Metacognitive skills (MCs): they are involved in the monitoring and control of cognitive processes (3). They are involved in the processes and individual strategies of learning and finding solutions to tasks and situations (for example: goal setting, planning, regulation of efforts).
- Non-cognitive skills (NCs): also defined as socio-emotional skills or soft skills (4), they refer to personal attitudes and behaviours that influence the interaction with the situation or task. These skills are not directly related to intellect. They are fundamental for building and developing human and professional relationships and interactions (for example: leadership, resilience, communication).
- Hard skills (Hs): are defined as teachable, measurable, specific, and specialized skills connected to a work activity (5). The teaching and learning processes of these skills are based on training, lessons, and hands-on experiences. Hard skills are essential to perform professional activities and satisfy specific work requirements (for example: data analysis, medical/clinical procedures or techniques, technical writing).
- Transferable skills (Ts): are defined as skills that can be applied in different roles, tasks, and professional areas (6). They are versatile and adaptable; therefore, they can be placed in different professional and work settings. Transferable skills are acquired and developed through educational and experiential processes. Transferable skills can come from any skill

group (for example: leadership, data analysis, planning, problem-solving, visual perception).

- Foundational skills generally all the essential skills for a wide range of work, personal and professional activities are transmitted. Furthermore, they are the skills that allow progressive learning and the development of further skills, knowledge and abilities (in general they are inherent in reading, writing, counting, solving problems, communicating, digitalisation/technologies, social and emotional). From a work/professional point of view, the foundational skills are different for each activity and have become the basis for carrying out the professional and work activity itself (7).

In this review, a "skill" is defined as an explicitly stated competence, capability, or learned ability that can be taught, practiced, and assessed in healthcare education or professional settings. We excluded generic values or broad goals unless they were operationalized as observable behaviors or competencies. To reduce semantic overlap, synonymous or highly overlapping labels were merged under a single code using a pre-defined rule set.

Thus, the objective of the present study was to identify, systematize and analyze the competencies described in the literature to support curriculum development and anticipate training needs in the face of technological changes and AI.

2. Methods

This manuscript contains a systematic scoping review with qualitative content analysis (8), aimed at mapping the healthcare "skills pack" described in the literature between 1993 and 2023 and identifying potential gaps in relation to current and future challenges. The review addressed the following questions:

- Which healthcare-related skills are most frequently reported in the literature?
- How can the extracted skills be grouped into broader skill areas/domains?
- Which domains appear less represented in the corpus, including emerging competencies such as artificial intelligence (AI) and digital health?

Literature searches were conducted on PubMed and Google Scholar. The search was developed using six long-tail keyword strings: medical educator skills, medical education skills, clinical educator skills, clinical education skills, healthcare educator skills, and healthcare education skills. Eligibility criteria were English language and publication years 1993–2023. No healthcare or social care branches, regions, cultures, manuscript types, or publication types were excluded a priori at the search stage. The PRISMA-ScR flow diagram summarizes the selection process (figure 1).

A total of 663 records were retrieved (156 from PubMed and 507 from Google Scholar) and exported to EndNote. After deduplication, 152 duplicates were removed, leaving 511 records. Exclusion criteria were then applied (non-English language, publication years outside 1993–2023, and books/handbooks). A free-full-text-or-next (FFNT) feasibility criterion was applied, excluding manuscripts not freely available or available only via institutional access. This choice ensured consistent full-text access for qualitative analysis across a large corpus; however, it introduces selection/availability bias, because open-access availability is not random across journals, disciplines, regions, and publication years. For transparency, this constraint is explicitly reported, and the resulting skills map should be interpreted as representative of the accessible corpus under the stated criteria rather than as an exhaustive representation of all existing evidence. After applying these criteria, 243 manuscripts remained.
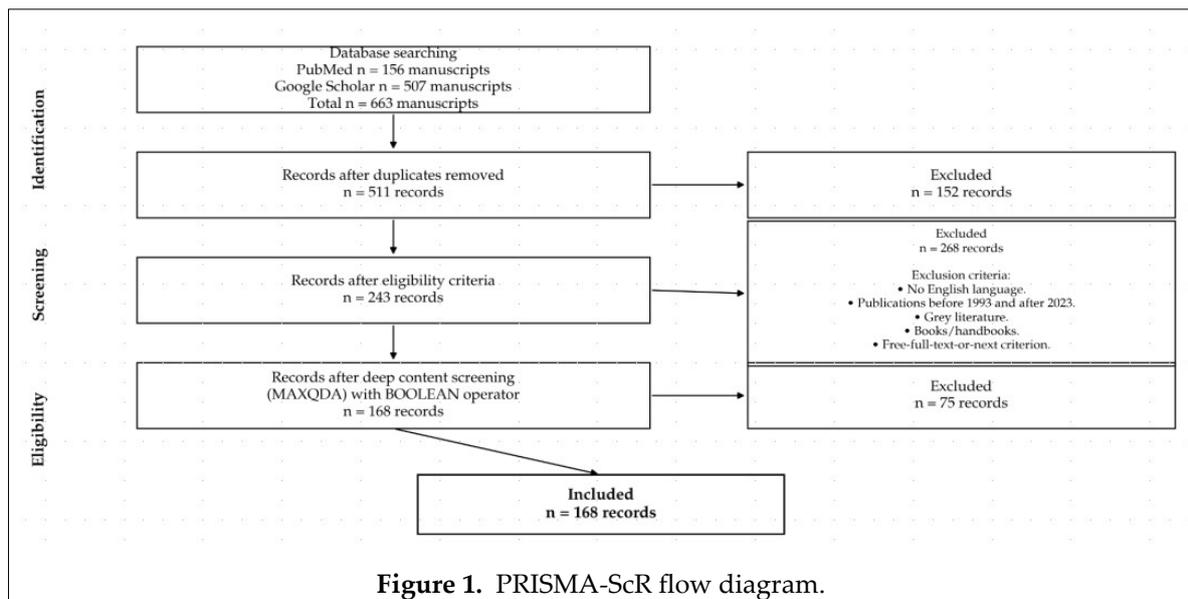
Figure 1. PRISMA-ScR flow diagram.

The 243 manuscripts were imported into MAXQDA for full-text content screening. A Boolean text-search procedure ("text search and auto-code") was applied using: medical educator OR medical education OR clinical educator OR clinical education OR healthcare educator OR healthcare education AND skill. This step yielded a final corpus of 168 manuscripts, from which the healthcare skills pack was extracted.

Skills were extracted and coded in MAXQDA. A "skill" was defined as an explicitly stated competence, capability, or learned ability relevant to healthcare education or professional practice. Synonymous or highly overlapping labels were merged into a single code to reduce redundancy. Results are reported at the code level (N = 1024), with each skill counted at most once per manuscript to avoid within-document repetition. Skills were then grouped into broader areas/domains based on conceptual similarity. All skills coding were performed by the author. Therefore, coding decisions involve an element of subjectivity despite the use of consistent coding rules across the corpus. This is acknowledged as a methodological limitation. The data supporting the findings of this study are available in the FigShare repository: https://figshare.com/s/1137fd924d6f0ed00da4

3. Results

Through the qualitative analysis performed with MAXQDA, 1024 skills were coded across the 168 selected manuscripts. Results are reported at the code level (N = 1024), with each skill counted at most once per manuscript to avoid within-document repetition. Although the search timeframe was 1993–2023, the included corpus spans 1995–2023, as no eligible manuscripts were retrieved for 1993–1994. These codes were divided into nine fundamental areas (figure 2):

- Clinical/Medical area: 25.87% (265 codes),
- Teaching and Learning area: 24.21% (248 codes),
- Communication area: 16.60% (170 codes),
- Emotional area: 9.27% (95 codes),
- Interpersonal area: 8.59% (88 codes),
- Management area: 4.68% (48 codes),
- Psychomotor area: 6.25% (64 codes),
- Analytical area: 2.34% (24 codes),

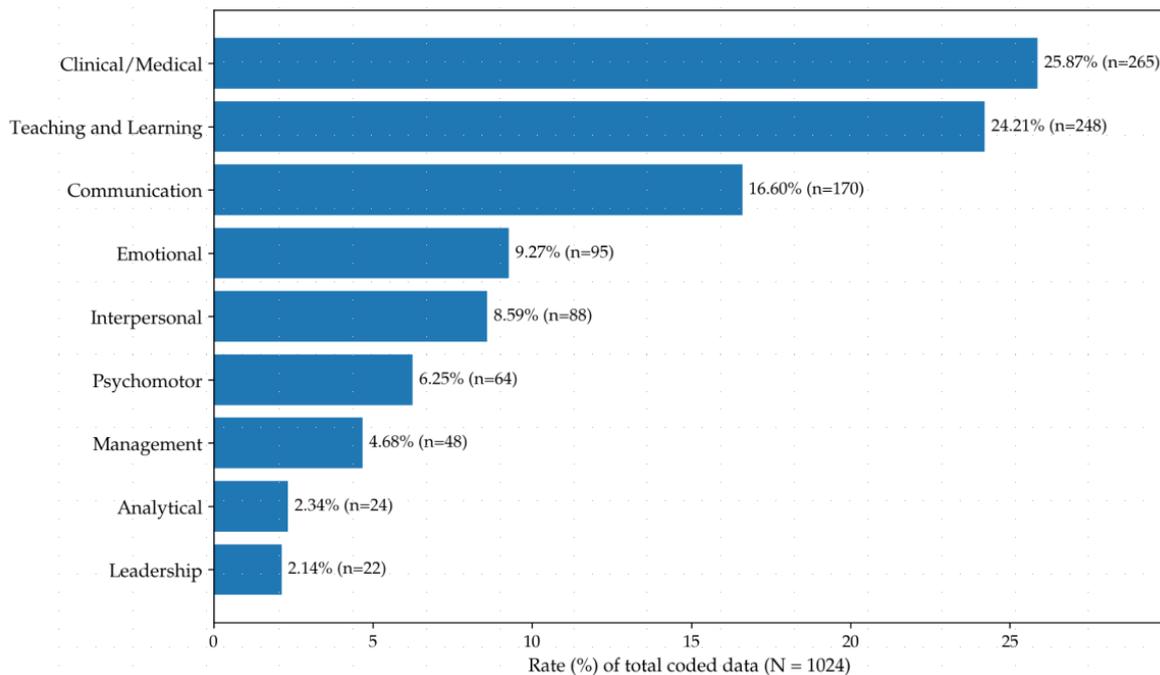- Leadership area: 2.14% (22 codes).

Figure 2. Distribution of skill codes (%) across nine areas (N=1024).

Each skill identified in a manuscript was coded only once per document observed. The internal composition of each area highlights specific priorities in the literature. All percentages reported in this paragraph refer to the distribution within each area (i.e., they sum to 100% within that area) and therefore should not be interpreted as percentages of the total 1024 codes. Within the Clinical/Medical area, codes are predominantly related to clinical (47.54%) and technical (31.69%) skills. Within the Communication area, the most frequent codes are general communication (54.11%) and anamnesis/info-taking (17.64%). Within the Emotional area, problem-solving (32.63%) and reflective practice (13.68%) are the most prevalent, indicating that cognitive–reflective components are emphasized as part of clinical reasoning.

When examining individual skills as a proportion of the total coded data (N = 1024 codes), the healthcare "skills pack" is primarily composed of 21 core skills, which together account for 70.11% of all coded skills. The most prevalent skills are clinical skills (12.30%), communication skills (8.98%), technical skills (8.30%), and teaching skills (6.73%). In contrast, skills related to social interaction and teamwork show comparatively low prevalence, including interdisciplinary skills (1.17%), social skills (1.17%), and behavioural skills (1.07%).

The 21 core skills are (table 1). Clinical skills (12.30%), communication skills (8.98%), technical skills (8.30%), teaching skills (6.73%), critical evaluation skills (3.71%), learning skills (3.51%), problem solving skills (3.02%), anamnesis/info-taking skills (2.92%), practical skills (2.83%), interpersonal skills (2.34%), analytical skills (2.14%), psychomotor skills (1.95%), leadership skills (1.85%), clinical educator skills (1.36%), reflective practice skills (1.26%), presentation skills (1.26%), interdisciplinary skills (1.17%), social skills (1.17%), relational skills (1.17%), behavioural skills (1.07%), and non-technical skills (1.07%).

4. Discussion

The present review highlights that the methodological pathway used to conduct the literature review, the generation of the skill areas, and the management of the coded skills inevitably involve

subjective choices. Different methodologies and analytical approaches can highlight different results, and the free-full-text-or-next (FFNT) criteria may generate a selection bias. Nonetheless, by extracting skills from 168 manuscripts across different branches of health and social care, it is possible to outline a current "healthcare skills pack" that reflects how competencies are most framed in the literature.

Table 1. Core skills (%).

#	Core skill	Rate (%)
1	clinical skills	12.30
2	communication skills	8.98
3	technical skills	8.30
4	teaching skills	6.73
5	critical evaluation skills	3.71
6	learning skills	3.51
7	problem solving skills	3.02
8	anamnesis/info-taking skills	2.92
9	practical skills	2.83
10	interpersonal skills	2.34
11	analytical skills	2.14
12	psychomotor skills	1.95
13	leadership skills	1.85
14	clinical educator skills	1.36
15	reflective practice skills	1.26
16	presentation skills	1.26
17	interdisciplinary skills	1.17
18	social skills	1.17
19	relational skills	1.17
20	behavioural skills	1.07
21	non-technical skills	1.07

Across the included corpus, the prevalence of medical/clinical, technical, teaching, and communication skills is consistently high, suggesting that current competency discourse remains anchored to traditional clinical performance and education-related practices. In parallel, the distribution of codes indicates a comparatively lower visibility, at least apparent, of skills related to emotions, mental health, interpersonal relationships, inclusiveness, and equity. This pattern should be interpreted cautiously: the lower prevalence may reflect differences in terminology, reporting practices, and conceptual boundaries across disciplines, rather than a definitive lack of relevance. However, as a corpus-level signal, it points to an imbalance between technical-clinical competencies and a broader set of human-centric capabilities increasingly emphasized in contemporary healthcare.

A further finding is the absence (or limited explicit presence) of skills linked to generative artificial intelligence, lifelong learning, and e-Healthcare within the extracted skills pack. This may be influenced by the time distribution of literature, by the search terms adopted, and by how emerging competencies are described (e.g., under umbrella terms such as digital health, clinical decision-making support, informatics, or technology-enabled care). Even so, the lack of significant indications regarding AI- and digital-related competencies remains noteworthy, given the rapid integration of digital tools into clinical work, education, assessment, and patient communication.

If the extracted skills can highlight the trajectory and state of the art of healthcare competencies, then it becomes appropriate to interpret these findings considering the evolving needs of health and social professions, as well as the real needs of students, workers, and patients. In this regard, the opportunity to consider soft skills relating to emotions, interpersonal relationships, and social skills, together with competencies related to new technologies, as foundational skills for students and health and social workers should be carefully considered.

A reframing of these competencies as "foundational" (rather than supplementary) may support safer care, better team functioning, improved patient experience, and stronger adaptation to changing service models. Because the skills extracted in figure 2 derive from manuscripts spanning 1995 to 2023, they describe clear strengths and established priorities within the published literature. At the same time, this time window also underscores the need to understand how competencies must be developed, updated, and strengthened in relation to distance learning, inclusiveness and equity, accessibility, sustainability, LGBTQ+ topics, mental health, and technological innovation. These priorities are increasingly central in a forward-looking vision of health systems transformation, faculty development, and professional practice, and they should be addressed in alignment with broader global objectives such as the UN 2030 Agenda and workforce-oriented proposals (9-10).

Several aspects may influence the observed distribution. First, the adopted methodology and the subsequent categorization of skills can shape what becomes more salient. Second, the FFNT criterion may systematically privilege freely available publications and thereby alter the corpus composition. Third, counting each skill at most once per manuscript supports comparability across heterogeneous manuscript types, but it does not capture within-document emphasis. These considerations do not invalidate the map produced, but they indicate that the skills pack should be interpreted as a structured representation of the included corpus rather than an exhaustive or definitive taxonomy of all healthcare competencies.

The proposed review highlights a strong emphasis on technical and clinical skills at the expense of competencies related to data analysis, artificial intelligence, inclusivity, and a people-centred approach. Although no records were excluded a priori based on geographic origin, region, or territory, inclusion was restricted to English-language publications and indexed sources. Therefore, the resulting skills map may underrepresent competency frameworks, professional role configurations, and educational priorities developed in Spanish-speaking and Latin American contexts, where relevant evidence may be published in other languages or disseminated through local outlets. We therefore recommend local adaptation of the proposed skills pack through stakeholder consultation (educators, practitioners, students, and patients) and alignment with national competency standards and health-system needs. At the same time, the present synthesis can serve as a global comparison tool, enabling cross-context benchmarking of skill priorities and facilitating identification of convergences and gaps across regions. This result, while potentially influenced by methodological choices and terminology, should be treated as a warning signal and an invitation to expand training beyond current standards, in line with evolving global needs and the next-generation challenges faced by healthcare education and practice.

This review has several limitations. The free-full-text-or-next (FFNT) criterion may introduce selection/availability bias because open-access availability is not random across journals, disciplines, regions, and publication years; therefore, findings should be interpreted as representative of the accessible corpus under the stated criteria. The restriction to English-language publications may underrepresent context-specific competencies and frameworks developed in non-English-speaking settings. While Google Scholar broadens coverage, its dynamic indexing may limit perfect reproducibility; search strings, dates, and selection rules are therefore reported as transparently as possible. All skills coding were performed by the author; despite consistent coding rules, an element of subjectivity remains. Counting each skill at most once per manuscript supports comparability but does not capture within-document emphasis.

Take-home message

The future of healthcare demands a closer balance between technical excellence and transversal competencies. To meet the challenges of the coming decade, healthcare professional training must evolve beyond traditional clinical standards by integrating technological innovation and a deeply person-centered approach focused on social equity. Further research is needed both to refine which skills should be included in the healthcare skills pack and to define how the package should be updated over the coming years. A practical approach would combine:

- Periodic evidence updates using transparent search and screening procedures.
- Expert consensus methods involving educators, practitioners, students, and patients.
- Targeted searches for fast-evolving domains (e.g., AI-enabled workflows, digital health, and lifelong learning).

The updated outputs could be versioned (e.g., "skills pack v1.0, v2.0"), openly shared as a dataset, and translated into actionable educational tools such as competency descriptors and assessment rubrics.

5. Conclusions

- The study analyzed the evolution of the "healthcare skills pack" over a thirty-year period, revealing a solid educational structure that requires urgent updating to meet modern demands. The following points summarize the main findings.
- Dominance of Clinical and Technical Skills: The review indicates that clinical, technical, and communication skills currently dominate the scientific literature.
- Identification of Critical Gaps: There is a notable lack of emphasis on emerging areas such as generative artificial intelligence, e-Healthcare, and lifelong learning.
- Need for a Holistic Approach: Data suggest that skills related to inclusivity, equity, sustainability, and mental health are underrepresented despite their growing global importance.
- Revaluation of Soft Skills: A paradigm shift is required to treat socio-emotional and interpersonal skills not as secondary, but as foundational competencies for clinical practice and education.
- Alignment with Global Goals: Future skill development must align with the UN 2030 Agenda and OECD proposals to ensure health systems are prepared for future challenges.

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