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A Scoping Review Mapping the State of Human Capital Development in Somalia: Strategies of Improvement, Their Barriers and Recommendations

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Abstract

Background: Somalia faces multiple human capital challenges, resulting in its human capital index being unranked by the World Bank. The Somali federal government commissioned this review to inform the development of the nation's strategic plan for implementing the Human Capital Development (HCD) agenda in Somalia. **Objective:** To map evidence on the human capital development (HCD) in Somalia, across health, Water, Sanitation, and Hygiene (WASH), education, social protection, gender equity, and innovation, as well as the strategies used to promote HCD, their barriers and recommendations. **Methods:** We searched Cochrane CENTRAL, MEDLINE, EMBASE, Web of Science, Africa Index Medicus, Scopus, and CINAHL from 15 February 2015 to 25 February 2025. We also searched for grey literature on multiple governmental and non-governmental websites. Study selection was conducted independently in duplicate, with discrepancies resolved through discussion. Results were synthesised narratively. **Results:** The search yielded 2056 records from databases and 1148 articles from the grey literature search, resulting in 56 articles included in this review. Most studies focused on health (67.9%), fewer on innovation (5.4%). There was low acceptance and uptake of ANC, immunisation, contraception and post-abortion (PAC), mainly due to low education levels, cultural and religious restrictions, financial costs, and long-distance challenges. Strategies to avert this primarily included behavioural and social-norm change initiatives. As much as mortality rates among neonates and mothers were reported, effective strategies were not reported. Stunting management and social protection were often managed using unconditional cash and food transfers. However, studies have reported variable results, suggesting the need to combine this strategy with

adequate counselling to enhance outcomes. Only one study reported that the gender parity index had risen from 0.80 in 2022 to 0.84 in 2023. Social norm correction strategies were effective in addressing gender-based violence matters. There was limited information on education. Those reporting on it mentioned strategies that encourage the use of local dialects in teaching to enhance educational acceptance, particularly among marginalised groups. Digital health records were the latest innovation adopted by more than 63% of health centres in Somalia. The innovation sector was greatly challenged by a lack of policy guidelines and their subsequent implementation. **Conclusion:** HCD is underreported in Somalia, presenting a need for a cross-cutting approach that incorporates further research on effective strategies to inform behavioural change communication, investment in service delivery, coordination across sectors, addressing institutional gaps, social norm shifts, policy development, and stakeholder engagement.

Keywords

Human Capital Development, Somalia

1. Introduction

Human capital, encompassing good health, knowledge, and skills, empowers citizens to achieve their productive potential and economic growth for themselves and the nation at large (The World Bank Group, 2020b). This project is expected to enhance political spaces for leaders to prioritise transformational human capital investments. Without a healthy, educated and resilient population, countries cannot compete effectively in the global economy (The World Bank Group, 2020b).

Despite the economic, political and environmental challenges, the African continent continues to make strides towards improving its human capital. The Human Capital Project by the World Bank Group aims to support African countries in achieving targets for reducing child mortality and stunting rates among children under five, increasing learning-adjusted years, expanding social protection coverage, and reducing the adolescent fertility rate (The World Bank Group, 2020b). According to the project, Africa has the highest return on education of any continent, with each additional year of schooling raising earnings by 11% for boys and 14% for girls (The World Bank Group, 2020a). It was also reported that between 2000 and 2017, the mortality of children under 5 years old dropped by 10% yearly in Rwanda and by over 6% per year in Uganda, Malawi, and Senegal. Botswana and Rwanda have reduced maternal mortality by over 7% annually. The adolescent fertility rate dropped by approximately 4% annually in South Sudan, Botswana, and Rwanda. Additionally, Africa has been developing its higher-level skills; university students have more than doubled since 2000 (The World Bank Group, 2020a).

However, Somalia (ranked as a low-income country in Sub-Saharan Africa) did

not report on its Human Capital Index (HCI); neither was its part of the 22 African countries that had committed to advancing the human capital agenda (The World Bank Group, 2020a). On top of the existing complex humanitarian crises and climatic shocks the country faces, the human capital is relatively low; statistics indicate that 67% of primary school children are not enrolled, 70% of its population is below 25 years old and only 35% of the nation's population is engaged in the labour market (Federal Republic of Somalia, 2021). Additionally, according to Relief Web, in 2024, approximately 6.6 million people needed Water, Sanitation, and Hygiene (WASH) humanitarian aid, increasing from 4.4 M in 2020 (ReliefWeb, 2024).

The low level of empowerment of women and girls further exaggerates the challenges mentioned above. For instance, the labour force participation rate was estimated at 65.9% and 37.6% among males and females, respectively (The World Bank Group, 2024). The maternal mortality ratio in Somalia has improved from 1097 in 2000 to 621 in 2020. However, this ratio is still higher than its regional average. The gap in adult literacy between men and women, 21, is more significant than that of the Sub-Saharan Africa aggregate, 12.4 (The World Bank Group, 2024).

The Somali federal government has initiated a drive to change by developing a Human Capital Development (HCD) Strategic Plan for Somalia, which is currently in progress. Building on lessons from its neighbouring countries (Kenya, Rwanda, and Ethiopia), Somalia's strategic plan for implementing the HCD agenda will focus on the key pillars of Health, WASH, Education and Social Protection, all focusing on Gender equity and innovation (The World Bank Group, 2020a).

To enhance and guide evidence-informed policy and practice, this review was commissioned by the Office of the Prime Minister of Somalia to provide credible insights that will inform and guide the development of the nation's HCD Strategic Plan. To complement the World Bank-led upcoming human capital review, this scoping review aimed to systematically map the available evidence on the HCD indices in Somalia, including health, WASH, education, social protection, gender equity, and innovation. Lastly, we aimed to identify the current and implemented strategies to promote HCD, their barriers and recommendations for success.

2. Methods

This scoping review was conducted using the Arksey and O'Malley scoping review framework and the guidance by the Preferred Reporting themes for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR) (Arksey & O'Malley, 2005; Tricco et al., 2018).

2.1. Identifying the Research Question

The overarching research question was, "What is the state of HCD in Somalia, its strategies for enhancement, and the barriers and recommendations in the enhance-

ment processes in health, WASH, education, social protection, gender equity and innovation?"

Specific Questions

1) What is the state of HCD in Somalia based on health, WASH, education, social protection, gender equity, and innovation?

2) What are the ongoing strategies and their progress in health, WASH, education, social protection, gender equity and innovation?

3) What are the barriers and recommendations for the success of these strategies to enhance HCID in health, WASH, education, social protection, gender equity, and innovation?

It is important to note that interventions could address multiple domains of HCD; therefore, we categorised studies by their primary objective. The following definitions guided our review;

1) **Health:** It encompassed mortality rates and stunting rates among children under 5 years and maternal mortality rates. It also encompassed the availability and acceptability of maternal health services and child immunisation services.

2) **WASH:** It encompassed the availability and accessibility of safe water, WASH facilities and infrastructure.

3) **Education:** We defined education as the availability and accessibility of Early Childhood Development (ECD) and youth skills acquisition through Technical and Vocational Education and Training (TVET), digital skills development, and entrepreneurship for individuals under 35 years of age.

4) **Social protection**: Initiatives geared towards financially supporting vulnerable persons/communities from shocks through cash transfer programs, health insurance schemes, as well as managing adolescent fertility and gender-based violence.

5) **Gender:** interventions geared towards reducing the gender equity gap in different sectors of the country (e.g., education, governance, career, finance).

6) **Innovation:** The development and adoption of new practices or technologies that enhance skills, outcomes and efficiency in education, healthcare, social protection, WASH and gender equity.

2.2. Eligibility Criteria

We used the Population, Concept and Context (PCC) framework to guide study eligibility as follows (Peters et al., 2020):

Population: Human population, regardless of age or gender.

Concept: Literature on HCD on the following indices: health, WASH, education, social protection, gender equity, and innovation. Lastly, the current and implemented strategies to promote HCD, their barriers, and recommendations for success.

Context: Somalia.

2.3. Types of Studies

We included studies published in English, qualitative, quantitative, and mixed-methods studies. We also included organisational reports, bulletins, and conference

abstracts with sufficient information. We excluded case studies, editorials, commentaries, case reports and conference abstracts with insufficient information due to their potential bias.

2.3.1. Information Sources

As much as we conducted a broad literature search from inception to 25 February 2025, we limited our literature searches to the past decade (25 February 2015-25 February 2025) because recent literature is more relevant in guiding research and policy interventions in this area. With the aid of an information specialist (VL), we conducted literature searches on the following electronic databases: Cochrane CENTRAL Issue 2 of 12, February 2025, Medline (OVID), EMBASE (OVID), Web of Science (all databases), Africa Index Medicus, Scopus (Elsevier), and Cinahl (EBSCO host). We searched for grey literature on the Google Scholar website and reports and bulletins on the following organisational websites; World Health Organization (WHO), United Nations Children's Fund (UNICEF), United Nations High Commissioner for Refugees (UNHCR), United Nations (UN), World Bank Group (WBG), International Organization for Migration (IOM). United Nations Development Programme (UNDP), Heritage Institute for Policy Studies (HIPS), Global Enrichment Foundation (GEF), and Worldwide Somali Students & Professionals (WSSP), Food Security and Nutrition Analysis Unit—Somalia (FSNAU), United Nations Educational, Scientific and Cultural Organization (UNESCO), *Kreditanstalt für Wiederaufbau* (KfW), Global Partnership for Education, Africa Development Bank, Islamic Development Bank, European Union (EU), *Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung* (BMZ)—this is the German Federal Ministry for Economic Cooperation and Development. We also examined the Somali National Bureau of Statistics and the Somalia National Development Plans 8 and 9.

We also searched the reference lists of included studies and systematic reviews. We used the following key search terms, along with their synonyms: ("Human Capital Development") OR ("Human Development Index") OR ("Human Capital Index") AND ("Strategy") OR ("Initiative") AND ("Barrier") OR ("Recommendation") AND ("Somalia"). The full search strategy for the database searches is provided under **Annex 1**.

2.3.2. Study Selection

We uploaded all identified articles into the Covidence (a systematic review manager) platform for study selection (Covidence, 2024). Two reviewers (LW and MAH) independently screened the titles and abstracts and subsequently assessed the full-text articles for eligibility. We resolved conflicts through discussion and consensus.

2.3.3. Charting the Data

Two independent reviewers piloted the pre-designed data extraction form on two duplicate records, making necessary adjustments. Thereafter, they conducted data extraction in duplicate, resolving comments through discussion and consensus.

We charted the following items:

1) General study details: Study title, lead author's surname/Organisation name, year of publication, study aim(s)/objective(s), geographical area (rural or Urban or peri-urban), study design, sample size, gender of participants and age of participants.

2) Concept: HCI reported, target indicator, statistics of the reported indicator, strategies used to enhance the given indicator, its barriers, and recommendations for improvement and sustainability.

2.3.4. Collating, Summarising and Reporting Results

We summarised the data using descriptive statistics for the quantitative data. We presented summaries of the key findings using tables. We have reported the results per the PRISMA-ScR checklist (Tricco et al., 2018).

3. Results

3.1. Study Selection

Our database search yielded 2056 articles, and 29 duplicates were removed (**Figure 1**). Thereafter, 2027 studies underwent title and abstract screening, and of these, 277 articles advanced to full-text review. Of these, 227 were excluded; thus, we included 50 articles in this review. We additionally searched for grey literature from relevant organisational websites, which yielded 1148 reports, all of which were retrieved. Upon screening for eligibility, 1142 studies were eligible. Thus, we included six reports due to the ineligibility of the rest based on our research questions. This brings the overall total to 56 articles.

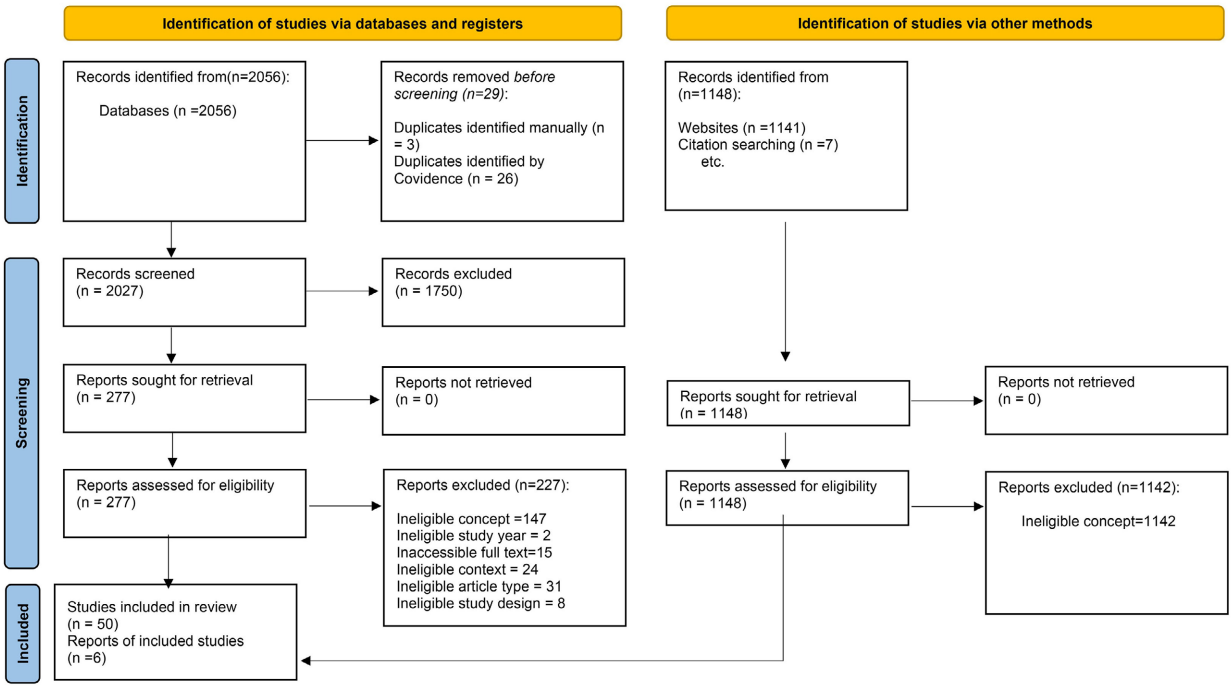

Figure 1. PRISMA 2020 flow diagram of included items.

3.2. General Characteristics of Included Studies

This review included recent articles, with most (73.2%) published between 2020 and 2025 (Table 1). Additionally, over half (82%) of the 56 included articles were journal articles, mainly using secondary data analysis methods (30.4%). Most articles (67.8%) reported on health outcomes, with only three articles (5.3%) focusing on innovation matters. No study reported on the human capital index in Somalia, the human development index, or the knowledge index. However, only one article reported on the gender parity index.

Table 1. Characteristics of included studies.

Study Characteristics	Number of Studies (%)
Publication Year	
2020-2025	n = 41 (73.2%)
2015-2019	n = 15 (26.7%)
Article Type	
Journal article	n = 46 (82.1)
Reports	n = 7 (12.5%)
Theses	n = 3 (5.4%)
Study Designs	
Secondary data analysis	n = 17 (30.4%)
Qualitative studies	n = 11 (19.6%)
Descriptive studies (cross-sectional)	n = 10 (17.8%)
Not applicable*	n = 7 (12.5%)
Analytical studies (cohort, case-control)	n = 3 (5.4%)
Quasi-experimental studies (non-randomised)	n = 3 (5.4%)
Mixed methods	n = 3 (5.4%)
Randomised Controlled Trials (RCTs)	n = 2 (3.6%)
Outcomes of Interest	
Health	n = 38 (67.9%)
WASH	n = 9 (16.1%)
Social protection	n = 9 (16.1%)
Gender equity	n = 5 (7.1%)
Child education	n = 4 (7.1%)
Innovation	n = 3 (5.4%)

*Not applicable: Reports that did not highlight a study design.

3.3. Summary of Findings

3.3.1. Health

Availability, accessibility, and coverage of Antenatal Care (ANC) were the most reported health outcomes, recorded in 15 (38.4%) of 39 articles. In contrast, im-

munisation coverage followed, as reported in 13 (33.3%) of the 39 studies.

1) Availability, Accessibility and Coverage of ANC

This review found that the number of women attending ANC, even for their first visit, is low in Somalia. From the global perspective, the lowest ANC attendance was 9.4% from Somalia, as reported by a study using the Global Health Observatory of WHO (Yaya & Ghose, 2019). Similarly to this, the 2020 Somalia Demographic and Health Survey (SHDS) reported that 68% of women did not attend any ANC visits during pregnancy (Somalia National Bureau of Statistics, 2020). Three regional studies conducted in Somaliland, Southern and Central Somalia reported incomplete attendance at ANC visits, as most women attended only the first two visits. Thereafter, a significant dropout rate of almost 50% occurred in all three studies, leading to fewer women completing all four or more ANC visits (Miikkulainen et al., 2023; Mouhoumed & Mehmet, 2021; Yaya & Ghose, 2019). Notably, one study reported that most mothers (62.3% of 330) initiated ANC in the second trimester of pregnancy, contrary to the recommended 1st trimester (Mouhoumed & Mehmet, 2021).

Lack of knowledge on the importance and regularity of ANC visits was reported as a barrier in two studies (Miikkulainen et al., 2023; Mouhoumed & Mehmet, 2021). Long distance to facilities (Miikkulainen et al., 2023) and long waiting hours (Mouhoumed & Mehmet, 2021) were also reported as barriers. Possible recommendations in averting these barriers include increasing awareness among pregnant women and their husbands for a comprehensive support system (Miikkulainen et al., 2023).

The included studies did not report on strategies employed to enhance availability, accessibility and coverage of MCH.

2) Availability, Accessibility and Acceptability of Contraception Methods

Six of the studies on health reported on contraception, including post-abortion care. Contraception use in Somalia is critically low at less than 10%, with 90.9% of its female population having no intention to use contraception, as reported in three articles (Geta et al., 2024; Khalif et al., 2024; Somalia National Bureau of Statistics, 2020). Nationwide, modern contraception was used by only 0.9% of the population, with 6.1% preferring traditional methods, specifically, the rhythm method (Khalif et al., 2024; Somalia National Bureau of Statistics, 2020). The use of pills was selected by 0.4% of the population, with 0.2% using implants, 0.1% using Intrauterine Device (IUD) and Lactational Amenorrhea Method (LAM), and 0.03% using condoms (Khalif et al., 2024). The recognised family planning products in the country, according to the 2008 Somali Birth Spacing Guideline, are (Afifi et al., 2023):

1) Oral Hormonal Contraceptives

a) Ethinylestradiol (30 Âµg) + levonorgestrel (150 Âµg)

b) Ethinylestradiol (35 Âµg) + norethisterone (1 mg)

2) Injectables

a) Medroxyprogesterone acetate IM/SC injection

b) Estradiol cypionate + medroxyprogesterone acetate (5 - 25 mg) injection

c) Norethisterone enantate: 200 mg/mL in 1 mL ampoule

3) Implants

a) Levonorgestrel-releasing implant (150 mg)

b) Etonogestrel-releasing implant (68 mg)

4) IUDs

a) Copper-containing IUD

b) Levonorgestrel-releasing IUD

5) Emergency Contraceptives

a) Ulipristal tablet (30 mg)

b) Levonorgestrel (30 Âµg or 750 Âµg [pack of two]; 1.5 mg)

Multiple barriers to contraception use were identified. At the individual level, Knowledge of the availability, mode of action and benefits of contraception use was low at about 12.8% of the national population (Geta et al., 2024). Additionally, fear and misconceptions about the effects of contraception were also identified (Khalif et al., 2024). Social constraints included the value of large families, male dominance in decision-making or lack of engagement altogether and other competing problems such as poverty and hunger (Chukwumalu et al., 2017; Khalif et al., 2024; Mohamed et al., 2021). Contraception uptake was particularly challenging to pastoral communities within the Mudung region that faced challenges such as long distances to the health facilities, cost constraints and supply shortages affecting the availability and accessibility of contraceptives (Duale et al., 2023). A critical barrier was the reported absence of recent national family planning policies as well as weak referral pathways; the present guideline currently in use is the 2008 Somali Birth Spacing Guidelines (Afifi et al., 2023; Khalif et al., 2024; Mohamed et al., 2021).

Recommendations for enhancing this uptake included the immediate integration of contraceptive education and sensitisation activities for women and men of all ages. This should go hand in hand with prioritising the availability of quality sexual and reproductive health counselling and products in all health facilities, including pastoral regions and Internally Displaced Persons (IDPs) camps (Geta et al., 2024; Khalif et al., 2024). There is a need for regulatory oversight to facilitate the introduction of contraceptives in the formal markets, considering the willingness of pharmacists to stock and sell the contraception when made available in the market (Gure et al., 2016). Lastly, the development of evidence-based policies is critical in advocacy for the availability of these contraceptives from the clinical point of view (Afifi et al., 2023).

3) Post Abortion Care (PAC)

Abortion is a sensitive topic due to religious and social conservatism in Somalia, and due to this, the acceptability and availability of the services are low. According to the 2008 Somali Birth Spacing Guidelines, the medical termination drugs available in the country are *Misoprostol* (*either* 400 µg *or* 600 µg, *PO*) and *Misoprostol* and *mifepristone combipack* (Afifi et al., 2023).

A key strategy to promote the uptake of PAC, as reported in two regional studies, was the use of a multi-pronged PAC program (2012-2017) comprising capacity-building activities for women, a steady supply of services, products, and infrastructure, community collaboration and mobilisation, and, lastly, regular monitoring and evaluation (Chukwumalu et al., 2017; Gallagher et al., 2019). This strategy significantly increased the number of PAC clients, rising from 11 in 2012 to 1065 in 2017. Additionally, the percentage of PAC clients choosing contraception increased from 64%, and the use of Long-Acting Reversible Contraceptives (LARCs) rose from 14% in 2012 to 24% in 2017 (Gallagher et al., 2019). Narrowing down to a study in Puntland (2013-2015), the same strategy saw a high PAC acceptance rate, which was observed as 98% (1090/1111) of PAC clients were counselled for post abortion contraception, of which 88% (955) accepted a contraceptive method before leaving the facility (Chukwumalu et al., 2017). During this period, the monthly average of women receiving PAC increased from 19.91% (2013) to 34.75% (2014) and 37.92% (2015) ($p < 0.01$). 57% received Manual Vacuum Aspiration (MVA), 24% received misoprostol, and 19% underwent natural expulsion. The monthly mean number of PAC clients treated with misoprostol more than tripled from 3.17 (SD = 4.20) in 2013 to 11.5 (SD = 3.21) in 2015 ($p < 0.001$) (Chukwumalu et al., 2017).

The main barrier to this strategy was that Somalia is a religiously and socially conservative country with highly restrictive abortion laws, limiting them to life-threatening situations only (Chukwumalu et al., 2017). The project reported low involvement among men, citing it as a "woman's issue"; neither did it target youth. This could potentially be addressed by tailored messages for the diverse community awareness activities to engage and mobilise men and youth more effectively (Chukwumalu et al., 2017). Lastly, the weakened health system, damaged by protracted crises, challenges the integration of care activities into the healthcare facilities (Chukwumalu et al., 2017).

The positive outcome of this strategic approach highlighted the need for increased investment in expanding quality PAC in crisis-affected areas, since the quality and availability remain insufficient in Somalia (Gallagher et al., 2019).

4) Child Immunisation Coverage

This review identified that the national immunisation coverage among children below 5 years in Somalia is critically low, decreasing with each required immunisation visit. Approximately 65.2% of the nation's under-5 population was unvaccinated (Mahdi Hassan et al., 2024). Regionally, in the Mudug Galkayo region, only 20% of 357 children were fully vaccinated (Jama, 2020). In Mogadishu, 90.3% of 93 hospitalised children with measles had not previously received at least one dose of measles-containing vaccine (MCV1). On the contrary, Mogadishu had a higher vaccination coverage, with 74% of caregivers self-reporting that they were up to date with their child's immunisation, leading to only 26% having missed vaccine recommendations (Mohamud et al., 2025). In response to concerns about vaccine coverage, the UNICEF Country Office's Annual Report for 2023 reported

that 17.7 million polio vaccine doses were available in Somalia. In 2023, 3.8 million children under five were vaccinated, and 91% of health facilities offered immunisation services equipped with solar-powered vaccine fridges (UNICEF, 2023).

This low vaccine coverage was attributed to multiple cross-cutting barriers. From an individual perspective, the lack of knowledge, low education, religious beliefs and misinformation among caregivers resulting from the absence of population-specific strategies and meaningful community engagement initiatives was a key barrier reported across five studies (Abdullahi et al., 2020; Bile et al., 2024; Dhaliwal et al., 2024; Hsu et al., 2020; Mohamud et al., 2025). Among marginalised groups such as pastoralists, long distances to health facilities and financial costs were noted as barriers among pastoralist communities (Bile et al., 2024).

From a health system perspective, insufficient supplies and equipment hindered vaccination through facility-related stock-outs and a lack of on-site cold chain storage facilities (Bile et al., 2024; Mohamud et al., 2025). Additionally, there was a notable challenge in surveillance, monitoring and evaluation due to the absence of accurate demographic data, outbreak investigation, civil registration systems, and reliable population estimates (Bile et al., 2024; Hsu et al., 2020; Kamadjeu et al., 2015). Lastly, resource constraints and a heavy reliance on donor funding, coupled with a lack of transparency and misappropriation of funds, hinder immunisation efforts (Bile et al., 2024; Grijalva-Eternod et al., 2023; Hsu et al., 2020).

Recommendations to enhance vaccine coverage included the urgent prioritisation of targeted, context-specific awareness campaigns to strengthen caregiver awareness, focusing on vulnerable groups, poor households, pastoralists, IDPs and low-education caregivers (Abdullahi et al., 2020; Bile et al., 2024; Mahdi Hassan et al., 2024; Mohamoud et al., 2024; Mohamud et al., 2025). This can be achieved through trusted community Influencers in community engagement and advocacy, as well as local media engagement (Bile et al., 2024; Kamadjeu et al., 2015).

As for the pastoralists, seasonal migration patterns are known to local stakeholders, enabling targeted cyclic interventions based on the routes they take (Bile et al., 2024). With this, the use of mobile vaccine clinics and community health workers would enhance the coverage in remote areas or among pastoralist communities (Bile et al., 2024; Mohamud et al., 2025). Lastly, enhancing health systems through ensuring vaccine supplies, clear schedules, and staff training, alongside vaccination surveillance, monitoring, and record-keeping and contact tracing activities, was cited in 3 studies (Bile et al., 2024; Mohamud et al., 2023, 2025). The included studies did not report on strategies employed to enhance availability, accessibility and coverage of vaccines.

5) Mortality Rates among Children under 5

Eleven studies reported mortality rates among children under 5, most indicating a high mortality rate. According to the WHO's 2017 country Cooperation

Strategy for Somalia, the neonatal mortality rate was significantly high at 39.7 per 1000 live births [19.7 - 81.6], like the Under-five mortality rate at 136.8 per 1000 [80.2 - 242.4] (World Health Organisation, 2017). The neonatal and post-neonatal mortality rate from tetanus was also significantly high at more than 1000 deaths per 100,000 population and above five deaths per 100,000 population, respectively (Kyu et al., 2017). The Global Burden of Disease Study of 2016 ranked Somalia among the countries with the highest under-5 mortality rates caused by lower respiratory infections (417 per 100,000 people, [95% UI: 257 - 613]) (Troeger et al., 2017).

Regionally, among 513 neonates in Mogadishu in 2023, the mortality rate was observed as 26.5% [95% CI: 22.6 - 30.2] (Ali et al., 2024). In 2024, IDP camps within Mogadishu reported the death rate among 3898 children < 5 years to have exceeded emergency thresholds (>2 deaths per 10,000 children per day), reaching a peak of seven deaths per 10000 children per day during periods of protracted displacement and emergency influx amid the 2017 drought and health emergency (Seal et al., 2021). A hospital-based study conducted in 2020 in Somaliland among 164 neonates reported a mortality rate of 16 per 1000 live births in the hospital (Lundeby et al., 2020).

A vital recommendation identified was to strengthen the ability of healthcare workers and health institutions to provide antenatal, postnatal and newborn care, which is crucial (Ali et al., 2024). The included studies did not report on strategies employed to curb mortality rates among children under 5 years of age.

6) Maternal Mortality Rates

Three articles reported maternal mortality rates, indicating that the rates are high but have gradually reduced over the past 10 years. Somalia's maternal mortality rate dropped from 732 in 2015 to 692 maternal deaths per 100,000 live births in 2020 (Somalia National Bureau of Statistics, 2020). One per 1000 women aged 15 - 49 died from pregnancy or birth-related complications IN 2020. The death rate is highest among women aged 30 - 34, at 10.9 deaths per 1000 population (Somalia National Bureau of Statistics, 2020). WHO's 2017 Country Cooperation Strategy recorded a Maternal mortality ratio of 732 per 100,000 [361 - 1390] (World Health Organisation, 2017). The second study notes that between 2006 and 2020, there was a 44% reduction in the MMR, from 1044 to 592 per 100,000 live births ($p < 0.01$) (Aweis et al., 2024). The included studies did not report on strategies to curb maternal mortality rates.

7) Stunting Rates among Children under 5

Stunting rates remain moderately high in Somalia. The SDHS of 2020 reports that 27% of children are stunted, 16% are severely stunted and that stunting peaks at 21 months from birth (39%) (Somalia National Bureau of Statistics, 2020). The use of unconditional cash transfer was reported in two articles as a possible strategy to mitigate these high rates of stunting. The first one found no significant improvements in nutrition indicators, including stunting (Ali et al., 2022). This was attributed to poor socioeconomic and feeding practices among the target benefi-

ciaries and an extreme drought that hindered food production. It recommends that future cash transfer projects should consider providing proper training and supervision to the caregivers, the amount of cash given, and the other health and nutrition services provided to the children and caregivers to achieve a holistic effect (Ali et al., 2022).

3.3.2. Water, Sanitation and Hygiene

This review identified that the WASH situation in Somalia is greatly challenged. Four articles, including the UNICEF's 2023 Country Office Annual Report and the SDHS of 2020, reported that approximately 50% of the country's population lacked access to improved drinking water (Ahmed & Ali, 2024; Ismail et al., 2024; Mahdi Hassan et al., 2024; Somalia National Bureau of Statistics, 2020; UNICEF, 2023). Additionally, 50% of the population faced sustainable and safe drinking water shortages in 2023 (UNICEF, 2023). Regionally, out of 167 households in the *Jariban* district in Somalia, only 57.5% had access to safe drinking water sources (Mafuta et al., 2021). Additionally, 42.5% of respondents did not have access to safe drinking water sources, and only 10.8% confirmed that they treat drinking water at the point of use (Mafuta et al., 2021). However, one study reported critically low availability of improved drinking water sources (22.04% (95% CI: 21.5%, 22.4%)) among 32,300 participants from the *Awdal*, *Waqooyi Galbeed*, *Togdheer*, *Sool*, *Sanaag*, *Bari*, *Nugaal*, *Mudug*, *Galgadud*, *Hiran*, *Middle Shabelle*, *Banadir*, *Bay*, *Bakool*, and *Gedo* regions (Mahdi Hassan et al., 2024).

The Sanitation situation in the country is also reportedly weak. According to UNICEF's surveillance in 2023, only 33% of the national population used safely managed sanitation services (UNICEF, 2023). Additionally, the SDHS reports that more than half of the national population uses unimproved latrines: 6499 (41.1%) (Somalia National Bureau of Statistics, 2020). In the *Jariban* district of Somalia, it was reported that only 26.9% of 167 households had access to basic sanitation. Of the respondents, 44.3% shared latrines, resulting in open defecation.

Looking at strategies to enhance WASH in Somalia, one study conducted between October 2021 and March 2022 in the Kahda district reported the use of the *Surprise Soap intervention*, where soap with embedded toys was delivered through a short household session comprising a glitter game, instructions on how and when to wash hands, and Handwashing with Soap (HWWS) practice (Watson et al., 2023). There was an increase in HWWS in both the intervention group (+48 percentage points) and the control group (+51 percentage points) after baseline, and this increase remained stable over the 16-week follow-up period. Additionally, the presence of Handwashing stations increased from 81% to 96% (intervention) and 93% (control) (Watson et al., 2023).

Key barriers to adequate WASH coverage were limited involvement and coordination of diverse stakeholders and poor water quality, citing high chemical content and salinity (Dickin et al., 2022; Jama & Mourad, 2019).

As noted in one study, mutual accountability to strengthen national WASH systems was identified as a potential opportunity to achieve SGD-related WASH

outcomes (Dickin et al., 2022). However, it said that there were limited WASH Multi-Stakeholder Platforms (MSPs) due to the post-civil war recovery, with only two existing coordination mechanisms: the Inter-ministerial WASH Steering Committee, which focuses on government coordination, and the WASH Humanitarian Response Coordination Forum, which focuses on emergency response. This was attributed to barriers such as limited involvement of diverse stakeholders and a greater focus on humanitarian coordination than long-term WASH development (Dickin et al., 2022).

3.3.3. Social Protection

The most common strategy used for social protection was reported as an unconditional cash transfer and food and water aid, more so among IDPs, to enhance food security and livelihoods (FAO Regional Office for Africa, 2024; Foreman et al., 2018; Grijalva-Eternod et al., 2018, 2023). One study reported the use of food and water aid from NGOs to IDPs in averting drought and promoting social development in Badbaado Camp and Raja Camp (Abdi, 2015). This study found a positive effect, indicating that food and water supplies from NGOs aid in recovery from Droughts (mean answers = 2.60 and 2.99, respectively, with high agreement in both cases) (p-value < 0.005). However, two studies, conducted in Dayniile and Dharkanley and Mogadishu, reported no significant effect of unconditional cash transfers on food intake, food quantity or nutrition indicators, including stunting, wasting and underweight (OR: 0.78; 95% CI: 0.65 - 0.92) (Ali et al., 2022; Foreman et al., 2018), with one reporting an increase in household conflict (OR: 2.90; 95% CI: 1.29 - 6.48) (Foreman et al., 2018).

Some of the main barriers reported included poor socioeconomic and feeding practices among the target beneficiaries, extreme drought hindering food production and the lack of individualised and adapted nutrition counselling for each mother-child pair (Ali et al., 2022; Grijalva-Eternod et al., 2023).

One crucial recommendation to achieve significant effects was the provision of cash transfers alongside nutrition education and training, also known as *Cash-Plus* (Grijalva-Eternod et al., 2018). Secondly, attention should be given to assess unique contexts for deviations from average household size and population composition to ensure voucher entitlements are appropriate and aligned to community and household needs (Foreman et al., 2018; Grijalva-Eternod et al., 2018).

3.3.4. Gender Equity

Three articles reported on gender equity, highlighting the marginalisation of females, especially girls; however, various strategies have made positive progress toward achieving this. Only one article reported that the gender parity index in Somalia had risen from 0.80 (2022) to 0.84 (2023) (UNICEF, 2023). In Puntland and Somaliland in 2019, one study highlights that child marriage has become more common over the past decade, with the average age of marriage dropping to 14 (Kenny et al., 2019). While traditional arranged marriages still exist, elopement is becoming more frequent among adolescents (Kenny et al., 2019). It also notes that

education is highly valued, with parents expressing a strong desire for their children to complete their education before marriage. However, some parents accept early marriage due to societal pressures and norms (Kenny et al., 2019). Unlike in the past, when parents arranged marriages, adolescents now make their own choices, often without parental consent. Social media and smartphones facilitate relationships, leading to spontaneous elopements (Kenny et al., 2019).

In leadership, women's participation in local government politics has contributed to economic growth and development in Warta-Nabada District, Banadir, by prioritising their access to education, healthcare, employment recommendations, and socio-political rights (Adam, 2022).

One strategy to enhance gender equity is the Communities Care Programme (CCP), which facilitates dialogues with community members to catalyse Gender Based Violence (GBV) prevention actions and provides training to diverse sectors to strengthen response services for GBV survivors (Glass et al., 2019). The strategy targeted social norm transformation and gender relations instead of the usual behaviour change through knowledge and awareness (Kenny et al., 2019). This intervention was applied to 192 households in Mogadishu, resulting in a significant improvement in response to sexual violence (b = −0.214, $p = 0.041$, ES = 0.28), a significant decline in the husbands right to use violence (b = −0.309, $p = 0.003$, ES = 0.38) and an increased confidence in GBV service provision (b = 0.318, $p < 0.001$, ES = 0.67) (Glass et al., 2019). The main challenges faced included peer pressure resulting in early marriages, financial constraints leading to early marriages and the negative influence of technology enhancing elopement (Glass et al., 2019; Kenny et al., 2019).

3.3.5. Education

According to nationwide statistical analysis, educational levels in Somalia are low; 47% of females and 44% of males have never attended school (Somalia National Bureau of Statistics, 2020). Twelve percent have some primary education, but only three percent have completed it. Five percent attended secondary education, with only three percent completing it. Only 3% have completed higher education. By gender, 31% of females and 27% of males have some primary education. Younger males (20 - 24 years old) and females (15 - 19 years old) have the lowest rates of no education (21% and 23%, respectively) (Somalia National Bureau of Statistics, 2020). UNICEF reported similar findings: in 2023, 4.8 million children (ages 5 - 17) were out of school, one of the highest rates globally. Additionally, school attendance was at 21% for newly displaced children and 39% for non-displaced children (UNICEF, 2023).

The Somalia Education for Human Capital Development Project by the Global Partnership for Education, which aims at promoting equity in education for the most socially excluded children, saw 2650 students (49% girls) from marginalised and IDP communities receive school fee support via direct transfers to parents (The Global Partnership for Education, 2023). The project identified an urgent

need for more professional development, better learning materials, and structured in-service training. It recommended addressing barriers to girls' education and expanding scholarship programs, and improving school infrastructure planning and data management to increase access to primary education (The Global Partnership for Education, 2023).

Secondly, the use of the Alternative Basic Education (ABE) programme was used to improve educational outcomes for pastoralist children and internally displaced children from 2016 to 2020 (UNICEF, 2021). These educational facilities provided children with a place to learn in their mother tongue and to participate in recreational activities, thus yielding positive literacy results (UNICEF, 2021). The ABE programme supports girls through interventions focusing on menstrual hygiene and gender-sensitive water, sanitation, and hygiene facilities. In hard-to-reach and high-risk locations, UNICEF-supported training and cash incentives help ABE centres to retain their teachers (UNICEF, 2021). The national primary gross enrolment rate increased from 31% (2022) to 37% (UNICEF, 2023). Additionally, 20,248 children (8707 girls) from nomadic pastoralist and IDP groups enrolled in education for the first time. In 2020, 937 students (403 girls) graduated from the four-year Accelerated Basic Education (ABE) cycle, becoming eligible for secondary school. The included studies did not explicitly address matters related to ECD or TVET education strategies.

3.3.6. Innovation

Only three studies reported on innovation matters. Studies conducted in Mogadishu reported the use of digital health strategies such as Electronic Health Records (EHRs) (Elmi et al., 2024; Jeilani & Hussein, 2025). As of 2024, among 35 diverse healthcare facilities in Somalia, 63% had adopted EHR systems with reported benefits, including improved accuracy of patient records, enhanced efficiency in clinical workflows, and better coordination of care. However, barriers such as technical issues, financial constraints, and a lack of technical expertise were cited (Elmi et al., 2024). Digital health technologies in Mogadishu positively influenced healthcare workers' performance ($\hat{I}^2 = 0.473$, $p < 0.001$), significantly reduced healthcare workers' workload ($\hat{I}^2=0.241$, $p < 0.001$) and led to performance improvements ($\hat{I}^2 = 0.765$, $p < 0.001$) by streamlining tasks (Jeilani & Hussein, 2025).

However, in business, the innovation sector faces significant challenges in Mogadishu, as the country lacks an innovation policy and a science and technology framework for small and medium-sized enterprises and entrepreneurship (Daka & Siad, 2022). This makes doing business difficult. Additionally, no ministry was responsible for facilitating and embracing science and technology in the industry and technical institutions (Daka & Siad, 2022). It was recommended that science and technology be included in the national agenda to develop policy instruments addressing taxation and high electricity tariffs, as well as weak interlinkages among institutions and government agencies (Daka & Siad, 2022).

4. Discussions

4.1. The State of HCD in Somalia

A fundamental finding of this review is the absence of a formal HCI for Somalia. This aligns with the World Bank's designation of Somalia as unranked on the HCI, highlighting a data governance gap (The World Bank, 2020). In health, the state is critical. This review found ANC attendance among the lowest globally, with one study reporting as low as 9.4% (Yaya & Ghose, 2019). This is consistent with the 2020 Somali Health and Demographic Survey (SHDS), which found 68% of women had no ANC visits (Somalia National Bureau of Statistics, 2020). Similarly, the level of contraceptive non-use (over 90%) found in this review is in agreement with analyses by Khalif et al., who described it as a "contraception crisis" (Khalif et al., 2024). Consequently, the high maternal and under-5 mortality rates reported here are comparable to the estimates in the WHO's 2017 Country Cooperation Strategy, indicating a persistent and unresolved crisis in maternal and child health (World Health Organisation, 2017).

The WASH sector mirrors this crisis. This review found that approximately half the population lacks access to improved water and sanitation (Mahdi Hassan et al., 2024; Somalia National Bureau of Statistics, 2020; UNICEF, 2023). This finding converges with the 2024 WASH Humanitarian Needs and Response Plan, which reported a sharp increase in people needing WASH aid, emphasising the sector's vulnerability to climatic shocks (ReliefWeb, 2024). In the education sector, we identified some of the world's highest out-of-school rates. This agrees with UNICEF's 2023 report of 4.8 million out-of-school children in Somalia (UNICEF, 2023). The intergenerational educational deficit noted in the current study results, where nearly half the adult population has never attended school, is a finding that mirrors the broader challenges of educational access in post-conflict states, though the scale in Somalia is particularly severe (Somalia National Bureau of Statistics, 2020). However, the nascent state of innovation documented here is limited to digital health records (Elmi et al., 2024; Jeilani & Hussein, 2025) and hampered by a lack of policy (Daka & Siad, 2022). It contrasts with more stable developing nations that have established national science, technology, and innovation strategies.

4.2. Ongoing Strategies and Their Progress

In health, the most successful strategy identified was the multi-pronged PAC program (Chukwumalu et al., 2017; Gallagher et al., 2019). The significant increases in PAC clients and contraceptive uptake reported in Puntland (Chukwumalu et al., 2017) are directly supported by the findings of Gallagher et al., who demonstrated the model's effectiveness in humanitarian settings (Gallagher et al., 2019). In contrast, for ANC and immunisation, this review largely documented barriers rather than evaluated strategies. The reported low coverage contradicts the high-level activity reports of vaccine distribution, suggesting an implementation gap

between supply and uptake that future strategies must bridge (UNICEF, 2023).

For social protection, the divergent results for unconditional cash transfers—showing no effect on nutrition in one study (Ali et al., 2022) but a protective effect against acute malnutrition in another highlight a key area of disagreement in the literature (Grijalva-Eternod et al., 2018). This divergence likely stems from contextual factors and aligns with global debates on the efficacy of cash versus "cash-plus" approaches, suggesting that a one-size-fits-all model is ineffective.

For gender equity, the success of the CCP in transforming social norms is consistent with a growing body of global evidence, such as that cited by Glass et al., which argues that targeting relational norms is more effective than individual-level behaviour change alone (Glass et al., 2019). Similarly, in education, the positive outcomes of the ABE programme agree with global findings on the importance of the use of instructions in local vernacular language and flexible learning models for marginalised children (UNICEF, 2021).

4.3. Barriers and Recommendations for Success

The pervasive knowledge and socio-cultural barriers (e.g., misinformation, male dominance) found in health (Bile et al., 2024; Khalif et al., 2024; Miikkulainen et al., 2023) and gender equity (Kenny et al., 2019) closely mirror the barriers identified in WASH, such as the need for handwashing behaviour change (Watson et al., 2023). This convergence indicates that siloed health communication campaigns are insufficient. Furthermore, the critical barrier of weak policy and systems (e.g., the outdated 2008 Birth Spacing Guideline) (Afifi et al., 2023; Mohamed et al., 2021) is a finding that is replicated in the innovation sector, which suffers from a complete lack of a strategic framework (Daka & Siad, 2022). This repeated institutional weakness across disparate sectors emphasises a foundational challenge for the Somali state.

The recommendations from this review strongly converge with established best practices in global development. The call to prioritise behavioural and social norm change, evidenced by the success of the PAC program (Chukwumalu et al., 2017) and the CCP (Glass et al., 2019), aligns with the World Bank's emphasis on "soft" components of service delivery in its Human Capital Project (The World Bank Group, 2020b). The substantial evidence for context-specific service delivery like mobile clinics for pastoralists (Bile et al., 2024; Mohamud et al., 2025) is supported by the successful implementation of similar models in other nomadic populations, as seen in a study by Kamadjeu et al. in Somalia's north-east zone (Kamadjeu et al., 2015). Finally, the universal recommendation for strengthening systemic foundations through policy development and capacity building (Afifi et al., 2023; Daka & Siad, 2022; Mohamud et al., 2023) entirely agrees with the core tenets of the African Human Capital Plan, which stresses building resilient systems for long-term growth (The World Bank, 2020). The recurring identification of the same barriers and solutions across all six HCD pillars provides a powerful, consolidated evidence base for the Somali government to pursue an integrated, cross-cutting

HCD Strategic Plan.

5. Conclusion

This study highlights the substantial human capital development gaps in Somalia. Most studies reported health outcomes, highlighting a gap in reporting innovation, social protection, and education outcomes. This is quite clear since indices such as the human capital, knowledge, and human development index have not been reported, further showcasing the evidence void in these sectors.

Our findings revealed critically low health and education indicators, driven by socio-cultural, financial, and systemic barriers, among other factors. In addition, inadequate WASH and fragile infrastructure, governance, and resources impede population gains. Some targeted interventions have shown potential, but their effects remain diminished due to a lack of evidence-based policies and frameworks to support HCD.

Somalia's next steps towards strengthening its human capital call for long-term, multi-sectoral and resilient strategies anchored in robust data systems, behavioural and social-norm changes and government backing.

6. Study limitations

Our review was limited to English only; this could have potentially left out relevant articles done in other languages, leading to underrepresentation of local Somali or Arabic reports. Secondly, we could have potentially missed some articles due to limited access to government and non-governmental documents that are not available online. Lastly, the focus on published and publicly available articles could have disproportionally favored greatly researched areas such as health, and underreporting emerging areas. These should be greatly taken into consideration when reading and interpreting the reported gaps.

Ethical Considerations

We did not seek ethical clearance since this review used publicly available articles.

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Data Sharing Statement

Additional data and information regarding this review are available by emailing the corresponding author.

Authors' Contributions

Study conceptualisation: MAH. Protocol drafting: LMW. Study screening, inclusion and data extraction: LMW and MAH. Data analysis and write-up: LMW. Review and approval of final manuscript: LMW and MAH.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Annex 1: Search Strategy

Ovid MEDLINE(R) ALL <1946 to February 25, 2025>

1 Somalia/

2 Somali.mp. or Somalia.ti,ab.

3 1 or 2

4 Child Mortality/ or Infant Mortality/

5 3 and 4

6 ((child* or infant* or neonatal or newborn*) adj (death* or mortality)).ti,ab.

7 3 and 6

8 5 or 7

9 Economic Development/ or human capital index.mp. or Socioeconomic Factors/

10 3 and 9

11 sanitary surveys, water supply/ or maternal mortality/

12 3 and 11

13 Literacy/

14 educational status/ or literacy.tw

15 13 or 14

16 3 and 15

17 WASH.ti,ab.

18 3 and 17

19 (hygiene or handwashing or sanitation).ti,ab.

20 3 and 19

21 health inequities/ or gender equity/ or health status disparities/ or healthcare disparities/ or socioeconomic disparities in health/ or health equity.tw.

22 3 and 21

23 gender equity.ti,ab.

24 3 and 23

25 ((child* or infant*) adj2 (vaccin* or immuni*)).mp.

26 3 and 25

27 Child Development/

28 3 and 27

29 child* development.mp.

30 3 and 29

31 public policy/ or health policy/

32 3 and 31

33 ((adolescent* or teenage*) adj2 (fertility or pregnan* or childbirth*)).mp.

34 3 and 33

35 innovation*.mp.

36 3 and 35

37 Technology/ or new technolog*.mp.

38 3 and 37

39 wom?n health.mp.

40 3 and 39

41 Health Policy/ or "Delivery of Health Care"/ or health development.mp.

42 3 and 41

43 5 or 7 or 10 or 12 or 16 or 18 or 20 or 22 or 24 or 26 or 28 or 30 or 32 or 34 or 36 or 38 or 40 or 42

44 limit 43 to yr="2015 - 2025"

Scopus (Elsevier)

((TITLE-ABS-KEY (health AND policy OR health AND development)) OR (TITLE-ABS-KEY (innovation* OR technology)) OR (TITLE-ABS-KEY (((adolescent* OR teenage*) AND (fertility OR pregnan* OR childbirth*)))) OR (TITLE-ABS-KEY (public AND policy OR health AND policy)) OR (TITLE-ABS-KEY (child AND development)) OR (TITLE-ABS-KEY (((child* OR infant*) AND (vaccin* OR immuni*)))) OR (TITLE-ABS-KEY (health AND inequit* OR gender AND equity OR health AND status AND disparities)) OR (TITLE-ABS-KEY ((hygiene OR handwashing OR sanitation))) OR (TITLE-ABS-KEY (wash)) OR (TITLE-ABS-KEY (educational AND status OR literacy)) OR (TITLE-ABS-KEY (water AND supply OR water AND supplies)) OR (TITLE-ABS-KEY (maternal AND mortality)) OR (TITLE-ABS-KEY (economic AND development OR human AND capital AND index OR socioeconomic AND factors)) OR (TITLE-ABS-KEY (neonatal AND mortality)) OR (TITLE-ABS-KEY (child AND mortality OR infant AND mortality))) AND (TITLE-ABS-KEY (Somalia OR Somali)) AND PUBYEAR > 2014 AND PUBYEAR < 2026

Interface—EBSCOhost Research Databases

Database—CINAHL Complete

#	Query
S15	S1 AND S14
S14	S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13
S13	TX (Health Policy or health development) OR MH Delivery of Health Care
S12	TX (technology or innovation*)
S11	((adolescent* or teenage*) and (fertility or pregnan* or childbirth*))
S10	MH public policy OR MH health policy
S9	TX (((child* or infant*) and (vaccin* or immuni*))) OR TX child development
S8	TX (socioeconomic disparities or health equity)
S7	TX (health inequities or gender equity or health status disparities or healthcare disparities)
S6	TX WASH OR TX water supply OR TX ((hygiene or handwashing or sanitation))
S5	MH educational status OR TX literacy

Continued

S4	MH Economic Development OR MH Socioeconomic Factors OR TX human capital index
S3	TX maternal mortality
S2	MH Child Mortality OR MH Infant Mortality/ OR TX ((child* or infant* or neonatal or newborn*) and (death* or mortality).)
S1	MH Somalia OR TX (Somalia or Somali)

Cochrane Database of Systematic Reviews

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#1 Somalia

#2 MeSH descriptor: [Somalia] explode all trees

#3 Somali

#4 #1 or #2 or #3

Embase <1996 to 2025 Week 08>

1 Somalia/

2 (Somali or Somalia).tw.

3 1 or 2

4 Childhood Mortality/ or Infant Mortality/

5 ((child* or infant* or neonatal or newborn*) adj (death* or mortality)).ti,ab.

6 Economic Development/ or human capital index.mp. or Socioeconomic Factors.mp.

7 water supply/ or maternal mortality/

8 Literacy.tw.

9 educational status/ or literacy/

10 WASH.ti,ab.

11 (hygiene or handwashing or sanitation).tw.

12 health disparity/ or gender equity/ or health status disparities/ or healthcare disparities/ or economic inequality/ or health equity.tw.

13 gender equity.ti,ab.

14 ((child* or infant*) adj2 (vaccin* or immuni*)).mp.

15 Child Development/ or child* development.tw.

16 public policy/ or health policy/

17 ((adolescent* or teenage*) adj2 (fertility or pregnan* or childbirth*)).mp.

18 innovation*.mp.

19 Technology/ or new technolog*.mp.

20 wom?n health.mp.

21 Health care Policy/ or "Delivery of Health Care"/ or health development.mp.

22 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21

23 3 and 22

24 limit 23 to yr="2015 - Current"

WHO African Index Medicus

(Somalia OR Somali)

Web of Science

Databases: Science Citation Index Expanded, Social Sciences Citation Index, Conference Proceedings Citation Index—Science, Conference Proceedings Citation Index—Social Sciences & Humanities.

Number	Search Query
#1	Somalia or Somali (Topic)
#2	(child* or infant* or neonatal or newborn*) and (death* or mortality) (Topic) OR maternal mortality (Topic)
#3	Economic Development OR Socioeconomic Factors OR human capital (Topic) OR educational status OR literacy (Topic)
#4	WASH OR water supply OR (hygiene or handwashing or sanitation) (Topic) OR (health inequities or gender equity or health status disparities or healthcare disparities) (Topic)
#5	(socioeconomic disparities or health equity) (Topic)
#6	((child* or infant*) and (vaccin* or immuni*)) OR child development (Topic) OR public policy OR health policy or health development (Topic)
#7	(adolescent* or teenage*) and (fertility or pregnan* or childbirth*) (Topic) OR technology or innovation (Topic)
#8	#2 OR #3 OR #4 OR #5 OR #6 OR #7
#9	#8 AND #1
#10	#8 AND #1 and 2025 or 2024 or 2023 or 2022 or 2021 or 2020 or 2019 or 2018 or 2017 or 2016 or 2015 or 2014 or 2013 or 2012 (Publication Years)

Google Scholar

Find articles with all of the words: Somalia

AND

with at least one of the words: development health gender child vaccin*

Return articles dated between 2015-2025; Screened the first 100 results.