

## EDITORIAL

# Who published what on Somali health issues?

## Forming the policy for SHAJ through a bibliometric study

*In this editorial we attempt to define additional rationales for SHAJ, the Somali Health Action Journal, further to those presented in our inaugural editorial. We recognize the health information divide as one of the three health gaps characterizing the global health inequality landscape. The SHAJ venture emerged from a joint Somali-Swedish initiative to revive a former collaborative research programme also recognizing the need for a Somali-based platform for research communication. The members of the SHAJ Editorial team decided to join forces in designing and carrying out an empirical bibliometric study to assess the state of the art of the published literature on Somali health issues over a 75-year period covering major societal development eras in Somali academic history. This editorial is basically presented in the form of a report from this study, concluding with a statement on the policy implications for SHAJ and Somali based research for health.*

*The study raises concerns about the scarcity of research publications on Somali public health issues. This points to the need for research capacity strengthening in general with special attention to the important role of the newly established Somali universities. We note a lack of balance regarding the topics and public health relevance of published papers in relation to the burden of prevailing health problems which calls for efforts to set research priorities in tune with the broad needs of the communities. Another observation is that the papers reviewed indicate a heavy dependence of the research agenda on external organisations and funders, which calls for active attention to research ownership issues in terms of Somali leadership and authorship. There is a lack of dissemination channels for Somali based health research and limited possibilities for young Somali scientists to publish their studies. As a Somali-owned journal, we envisage that SHAJ can play a catalytic role in the promotion and dissemination of “Essential Somali Health Research”.*

## Background

### *Bridging the health gaps*

The past 30 years have seen an increasing awareness but a slow commitment to address the overriding global health gap. There are three dimensions of this gap - that of *health itself*, support for *health research* and access to *health information*.

*The first gap* was addressed by the WHO-initiated Commission on Macroeconomics and Health chaired by the Harvard economist Jeffrey D. Sachs in its landmark report from 2000 [1]. It set a new agenda since it focused on the causal link from health to development, stating clearly that improving the health and life expectancy of the poor is not only an end in itself but also a means to reduce poverty.

*The second gap* relates to differences in access to and capacity for health research and was addressed even earlier by the Commission on Health Research for Development in another landmark report presented in Stockholm in 1990 [2]. Its main finding was the “gross mismatch between the burden of illness which is overwhelmingly in the Third World, and investment in

health research, which is overwhelmingly focused on the health problems of the industrialized countries”. The Commission concluded that all countries, including low-income countries (LICs), should “vigorously undertake essential national health research (ENHR) to accelerate health action”, and that there was a need for “international partnerships that mobilize and focus the world’s scientific capacity on the highest-priority health problems”.

During the following decade, a number of international initiatives tried to address these problems, often referred to as the 10/90 gap, implying that only 10% of public and private resources spent on health research and development were devoted to conditions that account for 90% of the global disease burden. Low- and middle-income countries (LMICs) have gradually started to build up their infrastructure and capacity for health research although the gap in relation to high income countries (HICs) has not disappeared. ENHR is highly needed, particularly in fragile LICs like Somalia. Capacity building, aimed at performing appropriate tasks effectively, efficiently and

sustainably, is primarily a task for national governments, organisations and communities, but will require international or bilateral cooperation.

*The third gap* is about access to and capacity for health information, which is based on scientific evidence. Globalisation fosters collaboration and cross-cultural exchange of knowledge, values and norms. It is, however, also breeding brain drain, even if the era of epidemiological safaris to unprivileged communities may possibly be over. Low income and fragile countries like Somalia still lack smooth and reliable access to health information both from the global and national as well as at the local level.

Dissemination facilities for global health information as well as the results of local health research are often deficient and need to be developed and integrated in public health programmes and health care services as an essential condition for public health improvements. This is also the central topic of this study, which focuses on these issues in a Somali context.

### *A Somali perspective on health science publications*

While the global health situation at large has improved somewhat, serious challenges remain in the struggle for equitable development. Health research capacity of LMICs may have increased as evidenced from bibliometric data on publications in tropical medicine [3] although being unevenly distributed. Bibliometric studies indicate that increasing research outputs from African countries originate mainly from a group of six countries while others like Somalia are at the low end [4]. There remains a discrepancy between burden of disease and research. For instance, one study reports that articles from LMICs make up a very small proportion (9.2 %) of all publications in top paediatric journals [5] despite representing the majority of the world's burden of diseases.

While North/South research collaborations are common and often considered key to building research capacity in LICs, they are also afflicted with inequalities and need to be balanced with South/South cooperation [6]. That Africa has lagged behind in health research addressing its un-proportionally high burden of disease has also motivated appeals for African-led health research by means of efforts to empower African-based researchers by offering training and career opportunities as well as effective information exchange and collaboration [7]. Bibliometric data on genomics research capacity in Sub-Saharan Africa show that South Africa dominates the research output, which underlines the need to focus on regional capacity development [8].

Patterns of authorship reported in recent bibliometric studies reveal that inequalities and unfair practices are not only a problem of the past. A review of articles from LMICs in four top paediatric journals found that 40% of multi-country studies did not include authors from every LMIC involved, a phenomenon presented as “authorship parasitism”, and that there has been an overall dominance of authors from HICs in articles from LICs. Inappropriate

authorship assignment was reported by both LMIC and HIC authors [9, 10]. Another study on randomized controlled trials of HIV/AIDS, malaria and tuberculosis in LMICs 1990-2013 showed a modest increase in LMIC first authors but a much larger increase in non-LMICs authors [11]. Bibliometric data from another study on health publications in Sub-Saharan Africa 2014 -16 showed similar patterns and the authors concluded that publishing “about Africa without Africa” is still an ongoing issue [12].

Information about publications on health research with focus on Somalia is scanty. No specific information is given in the publications cited above. Two recent bibliometric reviews of health science publications from fragile and conflict-affected settings also lack Somali data [13, 14]. There is, however, one exceptional paper which focuses exclusively on a Somali setting, reviewing articles on experimental health research in Somaliland 1991-2013 [15]. It concludes that health research activities in Somaliland are extremely limited and reports that only 19 of the 37 included papers had co-authorship by Somaliland-based researchers and that only 21 stated ethical approval. The picture that emerges from the scanty bibliometric data is that health research on Somali health issues is limited and a field that needs to be explored.

### *A Somali-Swedish collaborative context*

Health research has a key role in rebuilding national health services and trusted social institutions in fragile countries that are recuperating from civil unrest and natural emergencies. This was the conviction of participants from seven new Somali universities, five Swedish universities and a Swedish non-governmental organisation (with membership of Somali diaspora as well as Swedish professionals) in a recent initiative to revive a previous Somali-Swedish programme of research cooperation, which started in 1981 but was cut short by the civil war in Somalia in the 1990s [16].

Contacts between Somali and Swedish participants in the original collaborative programme were maintained and in 2014 a joint initiative was started to respond to the need for health research and research capacity development in present day Somalia with special attention to the roles of recently established Somali universities [17]. So far a research training course has enabled young Somali academics to carry out and report on public health relevant field projects.

Recognizing the scarcity of Somali research publications, the parties have also recently launched the Somali Health Action Journal (SHAJ) for the dissemination of research and policy debates [18]. The journal is expected to play an important role in catalysing the development and dissemination of relevant health research by academic and administrative Somali institutions and also give incentives for young Somali scholars to do and report on health research. The creation of SHAJ was also the point of departure for the present study.

## Aims of the study

The aims of the study are to examine the past and present patterns of dissemination of information and research on Somali health issues and specifically

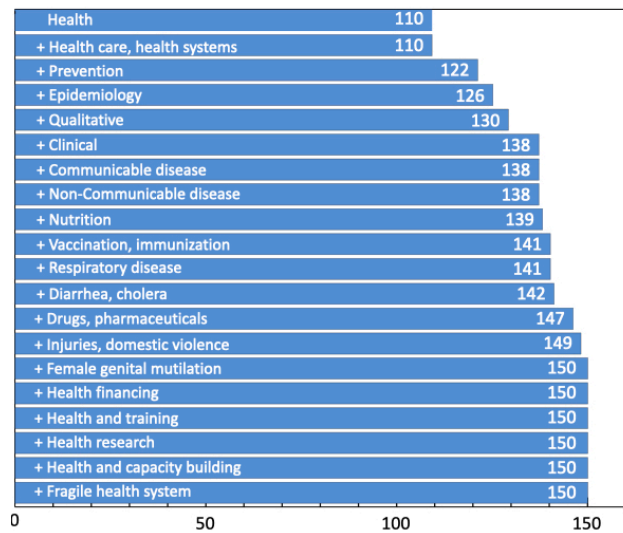
- to describe the scope and quantity of international peer-reviewed publications on Somali health issues;
- to analyse the patterns of health topics covered in the publications and their relevance for Somali health development;
- to assess the extent to which publications had Somali resident prime authors (first and last) and whether Somali institutions were involved;
- to throw light on ethical issues in collaborative research; and
- to serve as a *raison d'être* for initiating the Somali Health Action Journal as a forum for disseminating and sharing health information of relevance for Somalia.

## Material and methods

We opted for a bibliometric study to describe the patterns of publications on Somali health issues. Referring to our aims above and in order to capture core medical and health issues, we chose to use all data bases offered by Web of Science including both the Web of Science Core Collection and Medline as of 1945. To arrive at a search string to be used for selecting the study population of articles, we successively added relevant keywords, moving from broad to specific categories until we reached saturation as illustrated in Figure 1 for the year 2020. The following search string was used:

*[(Somalia OR Somaliland) AND (Health OR Health Care OR Health System OR prevention OR epidemiology OR qualitative OR clinical OR communicable disease OR non-communicable disease OR nutrition OR injuries OR vaccination OR immunization OR respiratory disease OR diarrhoea OR cholera OR drugs OR pharmaceuticals OR domestic violence OR female genital mutilation OR health financing OR health research OR (health AND training) OR (health AND capacity building) OR (fragile health system))]*

This search string was then applied on the whole study period 1945-2020, generating a total of 2,824 papers. A relevant alternative would have been a PubMed search, which in comparison gave a rather equal number of articles (2,034), most probably with a major overlap.



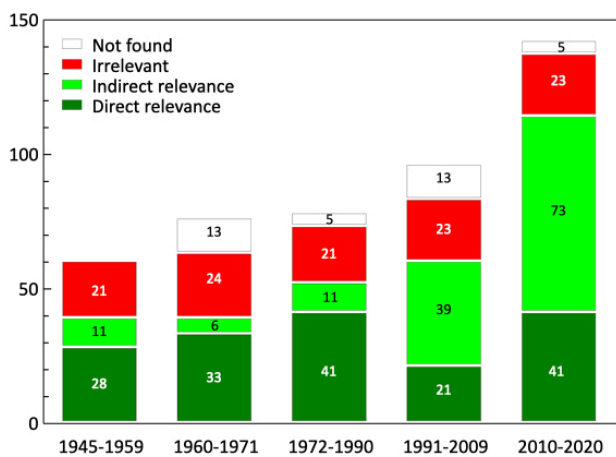
**Figure 1.** Illustration of the choice of search string through successive addition of keywords. Exemplified for the year 2020.

A division into time periods was motivated by the different societal and academic eras in Somalia. Five stages were recognized in its development process as described in the Appendix Box and in Table 1. To get a sufficient basis for addressing each time period, we chose to include all papers from 1945-71, to sample 25% of the articles 1972-90 and 10% in the period 1991-2020. This generated a total sample size of 454 papers stratified by time period (Table 1). The implications are that, when collapsing data to characterize the entire study period, we need to adjust for the different sampling fractions. This is done by weighting time-specific frequencies by the inverse of the sampling fractions when estimating relative frequencies for a subgroup characteristic for the entire study period.

The 454 papers were grouped into three categories of relevance. Thus, irrelevant papers were animal studies or articles that only marginally related to Somalia. Directly relevant papers were human studies specifically addressing health in Somalia/Somaliland while indirectly relevant papers dealt with health issues among Somalis abroad and related to refugees and migration. A total of 38 papers were either not found, were published in languages other than English, Italian, German and French or were only available as abstracts. Figure 2 shows the distribution over time in the above four categories and the remaining sample of papers consisting of 164 directly relevant and 140 indirectly relevant papers.

**Table 1.** Sampling strategy and distribution of study population of retrieved articles and of the study sample across time periods.

Time period	Characteristic	N=population size	Sampling fraction %	n=sample size
1945-1959	Pre-Independence	62	100	62
1960-1971	Independence	76	100	76
1972-1990	Academia Emerging	325	25	78
1991-2009	Civil unrest	937	10	96
2010-2020	Health System Recovery	1424	10	142
<b>Total</b>	-	2824	16	454



**Figure 2.** The study sample of 454 papers by categories of relevance and where the two green coloured fields constitute the remaining sample for analysis.

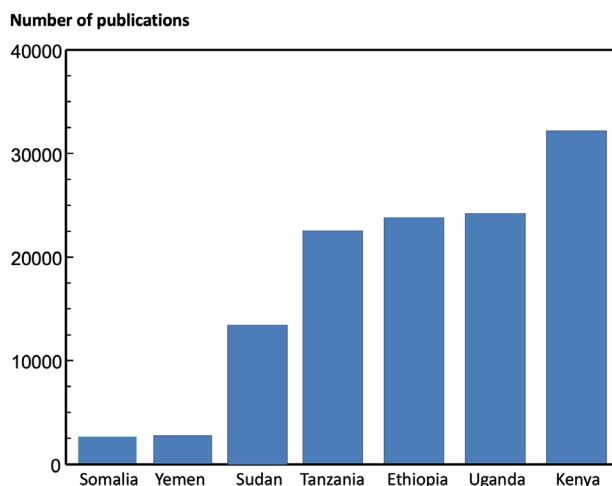
Three readers (KB, LLG and LF) were assigned for the assessment of the remaining 304 papers in terms of 15 variables defined to operationalize the research questions. The variable list had two sections. The first (Appendix Table 1) included three variables to cover health topics of relevance for Somali health development. The first characterized each paper in terms of what was the main health problem addressed in terms of “Burden-of-disease” categories [19]. A second variable specified the topic further by allowing a maximum of three specific health problems to be used for each paper and finally a third variable illustrated and characterized the paper by what health aspects, again a maximum of three, were covered in the paper beyond the specific health problems.

To address issues on research collaboration, including gender, we constructed six variables on ownership of data, analysis and funding. We also added three variables on methods and dissemination (Appendix Table 2).

The variable list was successively developed and adjusted in a pilot study of the first 30 papers read by all three readers, a process during which consensus among the readers was reached on the interpretation of each of the variable codes. The classification of authors’ ethnicity and gender was facilitated by the fact that one of the readers (KB) is a Somali national and with an Italian educational background. In case of uncertainty, the classification was given as “unclear” or “not identifiable”.

## Results

As a first step in the analysis of our data, and for the sake of comparison, we applied the same research string as for Somali/Somaliland on some neighbouring countries. This search, done for the same period (1945-2020), revealed considerably higher number of articles related to most of these countries, also if accounting for their higher (present) population sizes (Figure 3), in particular with regard to Kenya. Figures from Yemen, another fragile country, are in line with those of Somalia.

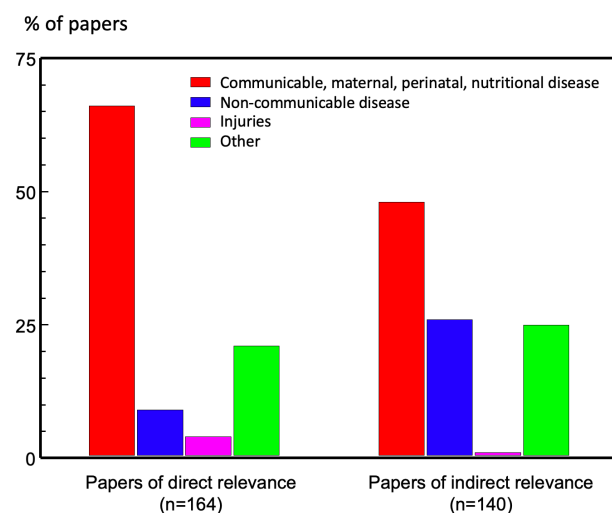


**Figure 3.** Number of publications (1945-2020) matching our search string comparing Somalia/Somaliland with some neighbouring countries.

Although we think the focus of the result presentation should be on the directly relevant papers, we have occasionally shown the two groups alongside each other. For transparency, the entire data can be retrieved and a complete result overview be accessed through the following [link](#). This shows the frequencies by each variable category, indicating also the availability and limitations of data. The result presentation below is grouped to relate to our study aims.

### Patterns of topics addressed by the papers

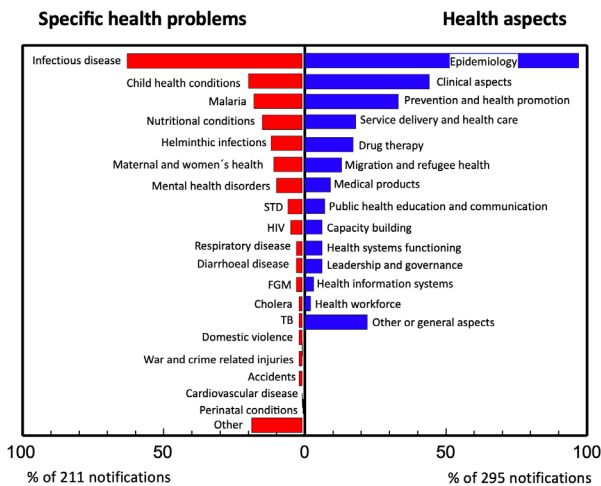
The majority of the directly relevant papers address the first “Burden-of-disease” group (communicable, maternal, perinatal and nutritional diseases) (Figure 4). In papers from 1945-1971, an average of 80 % of the publications were classified in this category. The corresponding figure in the recent decade was 56%. This disease group also dominated, although to a lesser degree, among papers of indirect relevance. Non-communicable diseases were rarely addressed in the directly relevant papers (Figure 4).



**Figure 4.** Distribution of papers on the broad categories of health problems as coded by the readers.



The papers were also characterized by which specific health problems they addressed. Readers of the papers could choose to include up to three among a list of 23 such problems. Figure 5 illustrates the dominance of the infectious disease category among the directly relevant papers. Looking at patterns over time for notifications of a selection of specific health problems, the proportion of papers devoted to infectious disease was 50 and 42 % respectively, during the periods 1945-59 and 1960-71, decreasing to 30% during the recent decade. Likewise, malaria and helminthic diseases were more frequent as topics of papers from the first two periods than later on. Maternal and women’s health conditions as well as infant, child and adolescent health were absent as topics of papers from the first two periods but appear as frequent topics in papers from 1972 and onwards.



**Figure 5.** Distribution of the 164 directly relevant papers on specific health problems and aspects in percentage of the total number of notifications (maximum of 3 per paper).

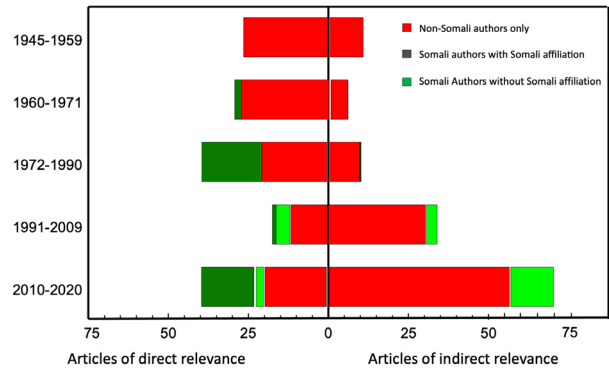
Regarding specific health problems as dealt with by indirectly relevant papers, most were published in the last three decades. During this time it is noted that in papers from the two most recent periods (1991 and onwards) there are more notifications of tuberculosis, maternal conditions, including female genital mutilation, and mental and substance abuse conditions than in the directly relevant papers from the same period.

Which general health aspects that the papers deal with, is also illustrated in Figure 5. Occurrence or epidemiology is the dominant category, measured as the proportion of the total number of notifications among all the directly relevant papers, with some fluctuation over time. This category also dominates the indirectly relevant papers. Capacity building topics appear among recent directly relevant papers but is largely absent from indirectly relevant papers. A special trait of the latter is the high frequency of migration and refugee health topics during the last three decades.

**Authorship and gender**

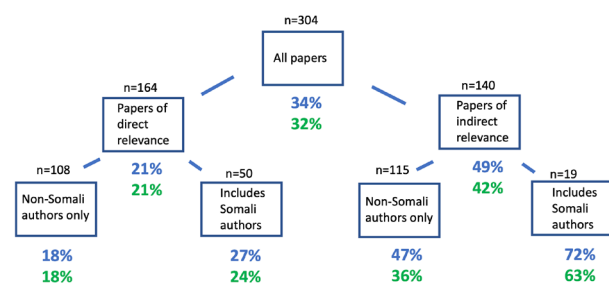
Figure 6 indicates that a large majority of the papers lacked Somali authors. For indirectly relevant papers,

basically addressing health issues among Somalis abroad, it is noted that there was no affiliation to Somali institutions. For the directly relevant papers, the affiliation to Somali authors and their institutions grew during the 1970s and 1980s, still many of the relevant papers lacked Somali authors. For the entire study period, when adjusting for sampling fraction (Figure 6, right), the proportion of directly relevant papers that were authored by non-Somalis only was 56 %. The corresponding figure for the indirectly relevant papers was 84%. A separate look at the past twenty years shows the same pattern (54% and 83% respectively).

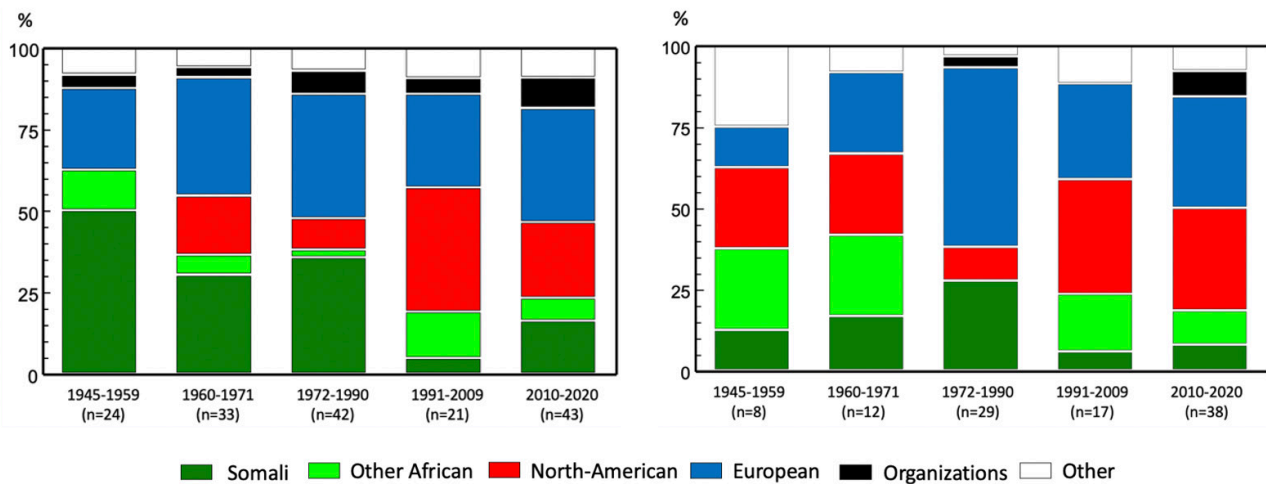


**Figure 6.** Distribution of authorship and affiliation over time in terms of number of articles.

Figure 7 shows that, while almost half of the indirectly relevant papers had a female first or last author, this applies only to every fifth of the directly relevant papers. This distinction increases further when accounting for the presence of Somali co-authors. When adjusting for sampling fraction across time, 31% of the directly relevant papers and 53% of the indirectly relevant papers had female first authors while the corresponding figures for female last authors were 24% and 42% respectively. Few females had lead authorship positions during the first 25 years of the study period. During the past twenty years the directly relevant papers had 35% as female first authors and 25% as female last authors. The corresponding figures for the indirectly relevant papers were 54% and 43% respectively.



**Figure 7.** Female position as first (in blue) and as last (green) authors for papers of direct and indirect relevance by categories of whether a paper includes Somali authors or not.



**Figure 8.** Institutional affiliation of first (left) and last authors (right) for the directly relevant papers. Numbers (n) denote subgroup size with available information. (1945-59 Somali health institutions were part of British and Italian administrations).

### Institutional affiliation and funding

Figure 8 shows a declining pattern of Somali institutional affiliation of first authors of directly relevant papers and a significant increase in North American and European institutional affiliation of both first and last authors. When adjusting for sampling fraction 19% of first authors had Somali institutional affiliation and 11% of the last authors. The corresponding figures for North American and European affiliations were 57% and 67% percent, respectively. None of the indirectly relevant papers had a Somali affiliation of first or last authors while the figures for North American and European affiliation were 76% and 78% respectively.

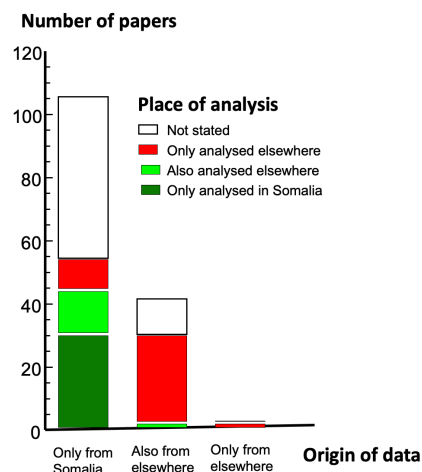
Statements on source of funding were missing in 65% and 54% respectively, in the directly and indirectly relevant papers. Only 11% of the directly relevant papers from 1991-2020 with information on funding, stated national (Somali) sources of funding, while 80% of them stated an international source of funding.

### Data origin and analysis

Most of the directly relevant papers were based on data originating only from Somalia (Table 2). This was the case in 75-78% of these papers from 1945-90 and in 38-61% respectively, from the more recent two periods. Data from Somalia in combination with data from other African and/or non-African countries was presented by about 20% of papers from 1945-90, increasing to 48% and 27% respectively, for the more recent two periods. As expected, the bulk of the indirectly relevant papers, those from 1991-2020, presented data that originated from outside Somalia.

Turning to the variable ‘place of analysis’, it was not possible to trace this in about 40% of all the directly relevant papers (Table 2). Only 4 (12%) of the 33 papers from the period 1991-2020 with information on this variable, reported that the analysis was done only in Somalia, whereas 25 (75%) reported that analysis was done only elsewhere. Figure 9, which is based on actual number of papers without adjustment for sampling

fractions, combines information on both the above variables, confirming the patterns described above.



**Figure 9.** Origin of data and place of analysis for the directly relevant papers (n=164).

### Types of studies

Table 2 shows the classification given to directly relevant papers according to kind of research. Quantitative surveys and epidemiological studies were common among them and also in the indirectly relevant papers, although to a lesser degree. Qualitative studies were relatively common among the indirectly relevant papers but less so in the directly relevant papers. There was a notable lack of intervention studies, while there was a high frequency of papers with clinical case reports in both groups. Among the directly relevant papers, however, the latter are confined to the earlier periods. Thus, over 30% of papers from 1945-90 were based on clinical case reports, whereas the corresponding figure for the period 1991-2020 was 8%.

### Dissemination

The 304 papers in our sample have been published in a large number and wide variety of different journals. The

**Table 2.** Distribution of the origin of data, place of analysis and study design for the directly relevant papers. SR and MR denote single and multiple response, respectively. Percentages have been adjusted for different sampling fractions.

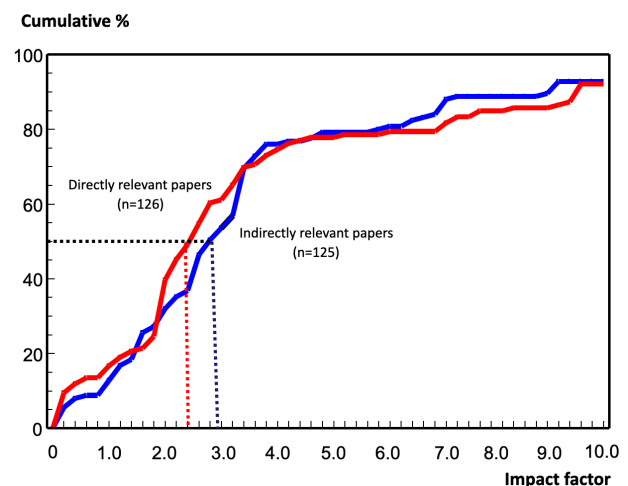
Variable	Category	Number of papers	Adjusted %
Origin of data (SR)	Data only from Somalia	111	59.6
	Data also from other African countries	26	15.5
	Data also from non-African countries	5	4.9
	Data from Somalia, other Africa and non-Africa	11	9.8
	Data only from other countries than Somalia	4	4.7
	Non-empirical	7	5.4
	<b>Total</b>	<b>164</b>	<b>100</b>
Analysis of data (SR)	Data only analysed in Somalia	30	11.6
	Data only analysed elsewhere	40	37.7
	Data analysed both in Somalia and elsewhere	16	9.0
	Place not identifiable or stated	65	41.7
	Not applicable	(13)	-
	<b>Total</b>	<b>151</b>	<b>100</b>
Study Design (MR)	Quantitative survey incl before-after survey	44	21.3
	Quantitative epidemiological	31	17.8
	Qualitative	7	5.7
	Mixed	12	11.8
	Clinical material and case study	38	12.6
	Randomized/Clinical/Intervention trial	7	2.3
	Laboratory study	21	12.1
	Literature /systematic review	17	11.4
	Non-empirical study	6	5.3
	Not Applicable	(18)	-
	<b>Total</b>	<b>183</b>	<b>100</b>

majority of the directly relevant papers were classified as original articles (49%) or Short Communications (27%). The corresponding figures for the indirectly relevant papers were 69% and 19% respectively.

We traced the impact factors (measuring the frequency with which articles published during a certain period, commonly two years, are cited during the following year) for the journals that published 251 of the 304 papers. Figure 10, showing the cumulative distributions separately for the directly and indirectly relevant papers, indicates that half of the papers were published in journals with impact factors (IFs) below 2.44 and 2.90, respectively. For the last 10 years the median impact factors for the two groups were somewhat higher, 3.08 and 3.30, respectively. For both groups, about 10% of the papers were published in highly ranked journals (with IFs above 10).

The fact that top medical journals have very high IFs makes the distribution skewed, which obviously inflates the mean values. The median values are therefore better representing and characterizing subgroups. Thus, while females are only first authors of 21% of the directly relevant papers, 64% of these papers have IFs above the median of all papers (2.44). The corresponding figure for papers having male first authors is 48%. Similarly, papers with female last authors have higher IFs (85% above the median) than papers with male last authors (56% above the median). Also, while 47% of the papers with non-Somali authors only have IFs above the median, the corresponding figure for the papers that include Somali affiliated authors is 55%. Of the papers having United

States or European institutional affiliations for first or last authors, 62% and 58%, respectively, have IFs above the median. This compares with 30% for the papers having a Somali institutional affiliation for the first author. Very few papers had a Somali institutional affiliation for the last author.



**Figure 10.** Cumulative distribution of current impact factors for the journals in which the sample of papers were published (dotted lines indicate median values). Information available for 251 of the 304 papers.

## Discussion

Our study seems to be unique as a bibliometric investigation to explore what has been published on Somali health issues in peer reviewed journals over a period of 75 years, ranging from the pre-independence era

to 2020. The findings are based on a sample of 304 papers from the total number of 2,824 papers identified through the search (the study population), stratified by 164 papers of direct relevance for Somali health development and 140 papers being based mainly on data about Somalis living outside Somalia/Somaliland.

From Web of Science statistics on the whole study population it is interesting to note the low number of listed Somali associated articles in comparison with those from the neighbouring countries, when applying the same search string. In relation to present population sizes, the Kenyan figures are about five times higher than those from Somalia, confirming the pattern noticed elsewhere that African medical publications are unevenly distributed between countries, with Somali at the lowest end [4].

It is a strength of our study that it covers a 75-year long period since the Second World War. In-depth data were generated for a reasonably large sample of papers individually read by three readers. No sample period contained less than 62 publications or a sample fraction below 10%. It can be argued that the classifications of data can be biased since only one person classified each paper. On the other hand, the three readers did calibrate their assessments using a dataset of 30 publications and agreed on the principles for classification of the data.

The following three sub-sections address three basic dimensions of the research questions we pose in our study. Our interpretations therein refer mainly to the subset of directly relevant papers (n=164).

### *Did topics reflect essential health research priorities?*

We disclosed clear changes in research topics covered since pre-independence and pre-academia periods after the Second World War. Looking at the whole material there is a clear dominance of publications dealing with health problems within the first “Burden-of-disease” group (communicable, maternal, perinatal and nutritional diseases) while there is a clear decrease over time. A significant trait is that only a minor fraction of papers across all study periods address non-communicable diseases, which is at odds with how these diseases have increasingly affected LMICs during recent decades.

Looking at a range of specific health topics there is a general preponderance of infectious diseases but with a decline over time. The impression of the readers is that many publications from the pre-independence period, often emanating from the military British East African command just after the war and from the Italian administration in 1950-60, were reports on epidemics and tropical diseases such as malaria and helminthic infections. The complete absence of articles addressing maternal, child and adolescent health conditions during this period and the first decade after independence is a significant finding. These topics appear with a modest frequency in the more recent periods together with topics such as nutritional, mental health and substance use conditions. Our interpretation of these data is that of an increasing trend for research addressing broader public health issues,

although the near absence of papers on non-communicable diseases indicates a need for attention by scientists as well as policy makers to health research priorities.

Turning to which health aspect the papers addressed, we noted the general dominance of papers on occurrence and epidemiology followed by clinical aspects. One could also discern some changes in this pattern over time giving more room for topics such as prevention and health promotion, service delivery and care, as well as capacity building and training during the recent decade. Again, this, in our view, indicates a trend towards more health systems oriented research, which is of interest to follow-up.

The indirectly relevant papers occasionally touched on health issues which may be of concern to national health development, in particular those from Somali communities in neighbouring Kenya and Ethiopia. But most of them, being published during the last three decades, related to the migration of refugees to Europe and North America. They were often dealing with the first “Burden-of-disease” group although to a lesser degree than the directly relevant papers. Not surprisingly there was a high rate of papers classified as dealing with migration and refugee health, 64 and 77%, respectively, for 1991-2009 and 2010-2010.

### *Ownership of research - what do our data tell us?*

It is remarkable that as many as 56% of all the directly relevant papers were authored by non-Somali researchers only. During pre-independence and pre-academia (1945-1971) periods all papers were authored by non-Somalis only, but even during the last 20 years the corresponding figure was 54%. Our findings confirm patterns reported from other African and other LICs (9, 10, 11, 12).

It is likely that Somali health research topics have seldom been defined by Somali researchers and institutions since only 19% of the whole material of directly relevant papers had Somali affiliated first authors and not more than 9% had Somali affiliated last authors. If anything, the proportions of papers with authors affiliated to institutions in HICs were maintained at these high levels also during the recent decade. It is apparent that Somali health research is heavily dependent on European and North-American Institutions since more than half of publications have both first and last authorships affiliated to these institutions. This is also reflected in the funding patterns. Although information on funding was available in only 35% of the papers it is noteworthy that only 11 % of papers from 1991-2020 with such information had stated national (Somali) funding while 80% had funding from international sources.

It is interesting to note that over the whole time period 31 and 24%, respectively, of the papers had female first and last authors. As expected very few females were in these positions during the early study periods but the figures from the last 20 years were still only 35 and 25 % respectively. Our data do not allow any conclusions as to how many of these were Somalis, but there is some



evidence that female gender is more common among first and last authors in articles which include Somali authors than in those with only non-Somali authors. Given the ambition of equality in science training and research opportunities, the gender balance in authorship may be a relevant yardstick.

### *Patterns of data generation, analysis and sharing – relevance for public health?*

Methodologically important information about origin and analysis of data were frequently lacking. Two thirds of all the directly relevant papers had data from Somalia only. What stands out is, that no information on where data were analysed was given in around half of all relevant papers. It is remarkable that only 4 of the 33 directly relevant articles from 1991-2020 reported that the analysis was done in Somalia only, whereas 25 were done completely outside Somalia, a further indication of the need for developing local scientific leadership and building research capacity.

The most striking observation regarding the types of studies reported is the very low rate of clinical or other health intervention trials during all study periods. The lowest rate, 2.4 % (1 of 63 papers), is actually found in the last two periods. Quantitative surveys together with epidemiological studies were dominant categories in all the periods, while qualitative studies were less frequent. Clinical case reports were frequent among papers from the early periods but were still a common entity (4 of 41 papers) in the recent decade. The low rate of papers reporting drugs and health intervention trials draws attention to the need for development of resources and skills for such studies in the context of public health-oriented action programmes.

The majority of all the directly relevant papers were classified as either Original Articles or Short Communications, the latter especially common in the early periods. There was also a relatively large proportion of review articles, particularly among papers from the more recent periods. The papers were published in a wide variety of journals; the 164 papers appeared in altogether 97 different journals. Seventeen % of the articles were published in 14 different high impact journals (impact factor >5).

The indirectly relevant papers were published in an even wider variety of journals; 140 journals for the 140 papers. Nineteen % of the articles appeared in 15 different high impact journals (IF>5). If considered a measure of quality it is just marginally above that of the directly relevant papers. In both cases the majority of these papers were published in the last two decades.

### *Implications for research capacity, collaboration and communication*

Since the 1990s and the publication of the Commission Report on “Health Research for Development” we cannot find that the ownership of health research for a country like Somalia has been strengthened. Surprisingly high

numbers of first and last authors are scientists from either Europe or North America. Unexpectedly, we found that place of analysis, both laboratory analyses and evaluation of clinical and epidemiological data, was not mentioned in a high fraction of the analysed articles. Ethical considerations on how international collaboration between foreign partners and researchers from resource limited settings are carried out need to be strengthened among researchers.

Our findings bring attention to the need for each scientific publication to contain information on how and where data were collected and to report where laboratory and clinical samples and data were analysed in the interest of transparency and reproducibility [20]. We also think there is an urgent need to agree on authorship criteria in international research collaborations. We suggest that the International Committee of Medical Journal Editors (ICMJE) incorporate rules in their recommendations about scientific publications on health and health services. We strongly feel that research in a specific country or region should not be carried out without involvement of scientists from the country-region studied. Only by involvement and leadership from local researchers, stakeholders and collaborators, can valid data be collected from communities in LICs [21].

The Commission on Health Research for Development drew attention to the skewed way in which global health problems were researched. Thirty years later the situation is not better for a country like Somalia. Apart from the need for improved funding and stronger research infrastructure, the creation of possibilities for publication of health research in a fragile country like Somalia is essential. The weak role of Somali researchers and their institutions in publication of research is a strong argument for the establishment of a nationally owned and controlled health research journal like SHAJ. Joint ownership of a medical research journal by universities in a fragile state is an important building block for establishing and maintaining an evidence-based national health research agenda.

## **Conclusions**

Our study points to a low research production by Somali academic and other organisations within the field of health when compared with regional neighbours. Since the pre-independence era the topics of health research publications have been dominated by communicable diseases and only gradually has broader public health matters including maternal and child health as well as nutrition been given a place. This and the absence of articles on non-communicable diseases, an emerging problem in Somalia as in other LICs, call for attention to the need for setting of research priorities in congruence with the health panorama. Our findings also indicate a lack of balance in the types of research reported, as exemplified with the near absence of papers on health intervention and clinical trials. The implication is, of course, the need for attention to and action for building

public health relevant research capacity. We feel that this is a challenge in particular for the new universities that have been established since the period of civil unrest.

We believe that research exerting a meaningful influence on health outcomes can only be carried out on a basis of local scientific leadership ensuring valid data collection with active engagement also of the local communities. Our data on authorship, institutional affiliation and funding indicate considerable dependence on external institutions and organisations, in particular North-American and European. This calls for the strengthening of Somali ownership of Somali based research – also in collaborative research ventures.

We envisage SHAJ to play a catalytic role in promoting Somali health research addressing priority health problems and in the development of capacity for this purpose. SHAJ will be a Somali owned communication platform, which will convey increased opportunities for Somali researchers to inform about their own research. SHAJ will also publish reports on collaborative or externally organised and funded Somali-based research - although with the requirement of active Somali authorship. The recent launching of SHAJ by a consortium of Somali universities joining in this enterprise was promising. It underlines their responsibilities and commitments in fulfilling the ambitions of SHAJ to become a catalyser for Somali health research in a way which will also consolidate social cohesion and solidarity.

## Summary in Somali

### CINWAAN

Yaa daabaca arrimaha caafimaadka Soomaaliya? Samaynta siyaasadda SHAJ iyada oo loo marayo daraasad faaqidaad cilmi ku saleysan

### SOOKOOBID

Tifaftirkan waxaan isku dayeynaa inaan ku qeexo sababo dheeri ah oo loogu talagalay SHAJ, Joornaalka Waxqabadka Caafimaadka Soomaaliyeed, oo dabasocda kuwii lagu soo bandhigay tafaftirkeennii ugu horreeyay. Waxaan aqoonsanahay kala-qaybsanaanta macluumaadka caafimaadku inay tahay mid ka mid ah saddexda daldalool ee haysta caafimaadka ee tilmaamaya muuqaalka sinnaan la'aanta caafimaadka adduunka.

Mashruuca SHAJ waa hindise si wada-jir ah uga soo baxay koox Soomaaliya iyo Sweden isugu-jirta kaas oo lagu soo noolaynayo barnaamijka iskaashiga cilmi-baarista ee hore, lana aqoonsanayo baahida loo qabo in la helo madal ku salaysan fidinta cilmibaarista Soomaaliya. Xubnaha kooxda Tifaftirka SHAJ waxay go'aansadeen inay isu geeyaan awooddooda xagga diyaarinta iyo fulinta faaqidaad cilmi, ee ku timid daraasad ku saleysan u-fiirsasho iyo tijaabo, si loo qiimeeyo aqoontii ugu muhimsanayd ee lagu daabacay qoraallo saameynaya arrimaha caafimaadka Soomaaliya muddo 75 sano ah oo ka warramaya marxaladihii ugu waaweynaa ee horumarka bulshada ee taariikhda tacliinta Soomaaliya. Tifaftirkan ayaa asal ahaan loo soo bandhigay qaab warbixin ah oo ka soo baxday daraasaddan, iyadoo lagu soo gabagabeynayo bayaan ku saabsan saameynta siyaasadeed ee SHAJ iyo cilmi-baarista Soomaaliyeed ee ku saleysan caafimaadka.

Daraasaddu waxay walaac ka muujisay gabaabsiga qoraallada cilmi baarista ee arrimaha caafimaadka guud ee bulshada Soomaaliyeed. Tani waxay tilmaamaysaa baahida loo qabo xoojinta awoodda cilmi-baarista guud ahaan iyadoo tixgelin gaar ah la siinayo dowlada muhiimka ah ee jaamacadaha cusub ee Soomaaliya. Waxaan ogaannay isku dheelir la'aanta mawduucyada iyo qoraallada la daabacay ee caafimaadka guud ahamiyad u leh, markii loo eego culeyska dhibaatooyinka caafimaad ee jira, kuwaas oo ku baqaya hawlga xooggan si loo dejiyo cilmi-baaris mudnaan leh oo waafaqsan baahiyaha ballaaran ee bulshada. Aragti kale ayaa ah in qoraalada dib loo qiimeeyey ay muujinayaan ku-tiirsanaan culus ajendaha cilmi-baarista hay'adaha dibadda iyo maalgeliyayaasha, taas oo u baahan in fiiro gaar ah loo yeesho arrimaha lahaanshaha Soomaaliyeed ee cilmi-baarista sida hoggaaminta iyo curinta qoraallada. Waxaa wali maqan hababkii lagu faafin lahaa cilmi-baarista caafimaad ee ku saleysan Soomaaliya, waxaana yar fursadaha hor yaal aqoonyahanka Soomaaliyeed ee da'da yar, xagga daabicidda daraasaadkooda. Maadaama uu yahay Joornaal Soomaalidu leedahay, waxaan ku talagalnay in SHAJ uu ciyaari karo door firfircoon, kaalin mug lehna ka qaadan karo horumarinta iyo faafinta "Cilmi-baarista Caafimaadka Soomaaliyeed ee Aasaasiga ah".

## References

- [1] WHO Commission on Macroeconomics and Health. Macroeconomics and Health: investing in health for economic development: report of the Commission on Macroeconomics and Health. Geneva: WHO; 2001.
- [2] Commission on Health Research for Development. Health Research – Essential link to equity in development. New York: Oxford University Press; 1990.
- [3] Falagas ME, Karavasiou AI, Bliziotis IA. A bibliometric analysis of global trends of research productivity in tropical medicine. *Acta Tropica*. 2006; 99: 155-159.
- [4] Kunert KJ, Botha AM, Oberholster PJ, Yocgo R, Chimwamurombe P, Vorster J et al. Factors facilitating sustainable scientific partnerships between developed and developing countries. *Outlook on Agriculture*. 2020; 49(3): 204-214.
- [5] Keating EM, Haq H, Rees CA, Dearden KA, Luboga SA, Schutze GE, et al. Global Disparities Between Pediatric Publications and Disease Burden from 2006 to 2015. *Global Pediatric Health*. 2019; 6: 1-8.
- [6] Maleka EN, Currie P, Schneider H. Research collaboration on community health worker programmes in low-income countries: an analysis of authorship teams and networks. *Global Health Action*. 2019; 12: 1606570.
- [7] Kasprovicz VO, Chopera D, Waddilove KD, Brockman MA, Gilmour J, Hunter E, et al. African-led health research and capacity building-is it working? *BMC Public Health*. 2020; 20:1104.
- [8] Adedokun BO, Olopade CO, Olopade OI. Building local capacity for genomics research in Africa: recommendations from analysis of publications in Sub-Saharan Africa from 2004 to 2013. *Global Health Action*. 2016; 9:31026.
- [9] Rees CA, Lukolyo H, Keating EM, Dearden KA, Luboga SA, Schutze GE, et al. Authorship in paediatric research conducted in low- and middle-income countries: parity or parasitism? *Tropical Medicine and International*

- Health. 2017; 22:1362-1370.
- [10] Rees CA, Keating EM, Dearden KA, Haq H, Robison JA, Kazembe PN, et al. Importance of authorship and inappropriate authorship assignment in paediatric research in low- and middle-income countries. *Tropical Medicine and International Health*. 2019; 24: 1229-1242.
- [11] Kelaher M, Ng L, Knight K, Rahadi A. Equity in global health research in the new millennium: trends in first-authorship for randomized controlled trials among low-and middle-income country researchers 1990-2013. *International Journal of Epidemiology*. 2016; 2174-2183.
- [12] Hedt-Guathier BL, Jeufack HM, Neufeld NH, Alem A, Sauer S, Odhiambo J, et al. Stuck in the middle: a systematic review of authorship in collaborative health research in Africa, 2014-2016. *BMJ Global Health*. 2019; 4: e001853.
- [13] Bertone MP, Jowett M, Dale E, Witter S. Health financing in fragile and conflict-affected settings: What do we know, seven years on? *Social Science & Medicine*. 2019; 232: 209-219.
- [14] Sweileh WM. Health-related publications on people living in fragile states in the alert zone: a bibliometric analysis. *International Journal of Mental Health Systems*. 2020; 14:70.
- [15] Boyce R, Rosch R, Finlayson A, Handuleh D, Walhad SA Whitwell S, et al. Use of a bibliometric literature review to assess medical research capacity in post-conflict and developing countries: Somaliland 1991-213. *Tropical Medicine and International Health*. 2015; 20: 1507-1515.
- [16] Somali-Swedish Action Group for Health Research and Development. Healing the health system after civil unrest. *Global Health Action*. 2015; 8:1. DOI: 10.3402/gha.v8.27381
- [17] Dalmar AA, Hussein AS, Walhad SA, Ibrahim AO, Abdi AA, Ali MK et al. Rebuilding research capacity in fragile states: the case of a Somali–Swedish global health initiative, *Global Health Action* 2017; 10:1, DOI: 10.1080/16549716.2017.1348693
- [18] Mohamud KB. Somali Health Action Journal – A Collaborative Venture for Health Research and Development. Editorial. *Somali Health Action Journal*. 2021.
- [19] Roser M, Ritchie H. Burden of Disease. *Our World in Data*. 2016. [cited 2021 Dec 16]. Available from: <https://ourworldindata.org/burden-of-disease>
- [20] Wallach JD, Boyack KW, Ioannidis JPA. Reproducible research practices, transparency, and open access data in the biomedical literature, 2015-2017. *PLoS Biology*. 2018; 16(11): e2006930.
- [21] Editorial. *Global Health Action at 15 – revisiting its rationale*. *Global Health Action*. 2021; 14: 1965863.

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## Appendix

**Box** Five stages of development in Somalia motivating for the delineation of time periods in the data collection and analysis.

- 1. Pre-Independence 1945-1960:** The British and Italian colonization led to the establishment of British Somaliland in 1884 and Italian Somalia in 1889. During the second world war in 1941, the Italian Somali colony was occupied by UK and remained as such until 1949-1950, following which the former Italian Somali colony was handed over to Italy as a United Nations Trusteeship for 10 years to lead the country into independence. Lack of Somali human resource capacities and infrastructure in both colonies made these years poor in research performance.
- 2. Independence 1960-1971:** On the 1st of July 1960, the two Somalia zones formed an independent united Somali government. the newly formed democratic government faced high expectations for securing effective delivery of social services including health. The severe shortage of qualified health workforce across the country was the biggest challenge faced by the health sector. This was confronted with optimism and nationalistic spirit by all sectors and health, in particular where efforts were directed on bridging the pre-independence access gap to health services across the country. However, the limited number of health professionals with no research training was not expected to promote health research implementation.
- 3. Academia Emerging 1972-1990:** The Somali National University based in Mogadishu obtained its official university status in 1969. The first courses were economics and jurisprudence. From 1971 to 1973, other degree courses were instituted including the faculty of medicine, established in 1972. The training of a considerable number of young physicians has contributed to the national health system and created notable capacity through the field training opportunities advanced by the designed medical education program. Parallel to the medical school, health science training programmes were organized producing the different health categories required by the national health system. During that period, a research cooperation was initiated in 1982, between the Swedish Agency for Research Cooperation with Developing Countries (SAREC) of the Swedish International Development Cooperation Agency (Sida) that was interrupted in 1990s due to the civil war. This cooperation has significantly contributed to research development in the country with the faculty of Medicine researchers taking the lead.
- 4. Civil unrest 1991-2009:** The country passed into a protracted civil conflict in 1991, when the central government broke down, with devastated national health system, where in many regional and districts the health services have disrupted its operations. The civil war has led to significant population displacement, diverted food aid, disrupted food distribution, and led to famine in many affected regions. As the humanitarian interventions prevail during a civil conflict, research was often limited to the humanitarian context interventions being carried out.
- 5. Health System Recovery 2010-2020:** In 2010 a new government was elected to office forming the Transitional Federal Government (TFG) that was internationally recognized and through which numerous reforms were implemented. These included the establishment of civil administration where civil servants and government soldiers formally received their salaries. Although the pace of health recovery was slow, the country has progressively rehabilitated its network of health services and started building its health workforce and academic training health institutions. Hence, the period 2010-2020, although many districts were still inflicted by conflicts, broadly the period was a mixture of early recovery that was linked to relief operations and a recovery phase with enhanced population resilience and the active engagement of all sectors including health in the development process.



**Appendix Table 1.** List and categories of variables characterizing health problems and health aspects of relevance for Somalia.

Area	Questions	Variables	Categories
Topics of relevance for Somali health development	What was the broad health problem category addressed in the paper?	Main health problem	<ol style="list-style-type: none"> <li>1. Communicable, maternal, perinatal, nutritional</li> <li>2. Noncommunicable diseases</li> <li>3. Injuries</li> <li>4. Other</li> </ol>
	What specific health problem(s) were addressed in the paper?	Specific health problem	<ol style="list-style-type: none"> <li>1. Infectious disease</li> <li>2. TB</li> <li>3. Sexually transmitted disease</li> <li>4. HIV</li> <li>5. Respiratory disease</li> <li>6. Diarrhoeal disease</li> <li>7. Cholera</li> <li>8. Malaria</li> <li>9. Helminthic infections</li> <li>10. Maternal conditions or women's health</li> <li>11. Perinatal conditions</li> <li>12. Infant, child and adolescent health conditions</li> <li>13. Female genital mutilation</li> <li>14. Nutritional conditions</li> <li>15. Cardiovascular disease</li> <li>16. Cancer</li> <li>17. Diabetes</li> <li>18. Neurological disease</li> <li>19. Mental and substance use disorders</li> <li>20. Domestic violence</li> <li>21. Accidents</li> <li>22. War-, crime-, terror-related injuries</li> <li>23. Other</li> </ol>
	What health perspective(s) were addressed in the paper?	Health perspective	<ol style="list-style-type: none"> <li>1. Clinical aspects</li> <li>2. Occurrence and epidemiology</li> <li>3. Prevention &amp; health promotion</li> <li>4. Leadership and governance</li> <li>5. Service delivery &amp; health care</li> <li>6. Health Systems functioning and financing</li> <li>7. Health workforce</li> <li>8. Medical products, vaccines etc</li> <li>9. Drug therapy</li> <li>10. Health information systems</li> <li>11. Capacity Building, basic and cont'd training</li> <li>12. Public health education and communication</li> <li>13. Migration and refugee health</li> <li>14. Other or general aspects</li> </ol>

**Appendix Table 2.** List and categories of variables characterizing research ownership, methods and dissemination.

Area	Questions	Variables	Categories
Ownership of research ideas	Who initiated the research?	Authorship	<ol style="list-style-type: none"> <li>1. Includes Somali author with affiliation/residence in Somalia</li> <li>2. Includes only Somali author without the above</li> <li>3. Non-Somali author(s) only</li> <li>4. Unclear</li> </ol>
	Gender and positioning of Somali authors and institutions?	Gender of first and last author	<ol style="list-style-type: none"> <li>1. Female</li> <li>2. Male</li> <li>3. Not identifiable</li> </ol>
		Institutional affiliation of first and last author	<ol style="list-style-type: none"> <li>1. Somali</li> <li>2. Other African based institution</li> <li>3. North-American</li> <li>4. European</li> <li>5. Regional or International organization</li> <li>6. Other</li> </ol>
	Who funded the research?	Funding source	<ol style="list-style-type: none"> <li>1. Stated as international (non-Somali)</li> <li>2. Stated as national (Somalia)</li> <li>3. Stated as none</li> <li>4. Not stated</li> </ol>
Ownership of data	Where was the study done and data collected?	Origin of data	<ol style="list-style-type: none"> <li>1. Data only from Somalia</li> <li>2. Data also from other African countries</li> <li>3. Data also from non-African countries</li> <li>4. Data from Somalia, other Africa and non-Africa</li> <li>5. Data only from other countries than Somalia</li> <li>6. Non-empirical</li> </ol>
	Where were data analysed?	Analysis of data	<ol style="list-style-type: none"> <li>1. Data only analysed in Somalia</li> <li>2. Data only analysed elsewhere</li> <li>3. Data analysed both in Somalia and elsewhere</li> <li>4. Place not identifiable or stated</li> </ol>
Research methods and dissemination	What type of study was done?	Study Design	<ol style="list-style-type: none"> <li>1. Quantitative survey incl before-after survey</li> <li>2. Quantitative epidemiological</li> <li>3. Qualitative</li> <li>4. Mixed</li> <li>5. Clinical material and case study</li> <li>6. Randomized/Clinical/Intervention trial</li> <li>7. Laboratory study</li> <li>8. Literature /systematic review</li> <li>9. Non-empirical study</li> </ol>
	What type of article was published?	Type of article	<ol style="list-style-type: none"> <li>1. Editorial</li> <li>2. Original Article</li> <li>3. Review Article</li> <li>4. Short Communication</li> <li>5. Debate Article</li> <li>6. Perspectives</li> <li>7. Methods</li> <li>8. Other type</li> </ol>
	In what journal was the article published?	Journal	<ol style="list-style-type: none"> <li>1. National</li> <li>2. Regional</li> <li>3. International</li> <li>4. High-impact</li> </ol>