Research and Publication Experiences of College of Health and Medical Sciences, Haramaya University, from January 2008-April 2018

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Abstract

Background: College of Health and Medical Sciences (CHMS), Haramaya University (HU), has been undertaking various research activities following thematic approaches. So far, there are no organized documents that clearly show the trend or pattern of research and publication works of the college. This review is, therefore, aimed to identifying, organizing and synthesizing the research and publication experiences of the college, so as to assist in the analysis of gaps from January 2008-April 2018.

Methods: Record reviews were done to identify the researches of Master and PhD students. Similarly, institutional (HU) repository searches were undertaken to retrieve staff research grants. Published and unpublished literature search was accomplished online from different databases or interfaces. In addition, few publications were retrieved by direct contact of staff/departments and search from HU website. Data were synthesized by considering subthemes or topics, year initiated or published, publishing journals, and designs of the works. Descriptive statistics were employed to present the data in tables and figures.

Results: This review identified 588 Master, 24 PhD, 125 staff grant researches and 335 publications. Main topics addressed by the staff research (30.4%) and published articles (20.6%) were areas of infectious diseases. Most of the staff research (90.4%) and published articles (80.6%) had applied cross sectional designs. Overall, the research developments of the college has shown linear increased trends over years with little fluctuations during certain periods.

Conclusions: Despite the little fluctuations, the research and publication experiences of the college have been almost constantly rising over the last ten years. Infectious diseases were the key areas studied and cross sectional design was the common method applied. With the studies, important public and clinical health findings were identified. Therefore, decision and policymakers are advised to consult these researches and researchers are recommended to focus on stronger methodologies that includes unaddressed aspects.

Keywords: *Research, Publication, College of Health and Medical Sciences, Haramaya University*

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Introduction

In addition to its human resource capacity development efforts, College of Health and Medical Sciences (CHMS), Haramaya University (HU), has shown a significant progress in research and community services (HU, 2018a). The research engagements in the college are being undertaken in thematic approach (HURA, 2018a). In this regard, the faculties and students have been addressing a number of health problems primarily under the theme of Human Health, Nutrition and Welfare (HNW). These include epidemiology of infectious and non-infectious diseases, reproductive, maternal, newborn, child, and adolescent health issues, human nutrition, and prevalence of various diseases, disease control approaches and strategies, among others (Mengistu, 2018).

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To accomplish these research responsibilities, the college has established Research and Publication Office in 2010 and other offices that facilitate research works through young faculty research grant and big research funds. Furthermore, there were different platforms and projects that have been implemented in the college which are directly or indirectly linked to the research development of the college. These included the Demographic and Health Surveillance System which was established to generate data that can serve as knowledge base for assisting health policy interventions; Medical Education Partnership Initiative (MEPI) project which was established to improve medical education and to enhance research and bioethics capacity of the college (HU, 2018a; HU, 2015); Haramaya University Communicable Disease Control (CDC) project (HU, 2015; HURA, 2018b) which has been supporting research capacity development requests of the college; and Center for International Reproductive Health Training (CIRHT) which has been funding few research proposals of the college's staff (HU, 2018a).

In order to compile these research works, the research office of the University has a policy to register and present patterns of research and publication activities for all themes and receives feedbacks from local communities on its annual research and community engagement forum. However, exhaustive and well organized synthesis that focuses on gaps of the research and publication works of the college and/or University with regard to major topics addressed, their methodological designs, years when the research works were initiated or published, and common journals publishing the works, among others, are not yet addressed. These analyses are thought to assist in aligning research priority areas (Theme II) of the University and/or college with the already addressed topics. This review is, therefore, aimed to identifying, organizing and synthesizing research and publication experiences of the college that can assist in the analysis of research gaps within the ten years review period (January 2008-April 2018).

Materials and Methods

Records of coordinating offices including Institutional Health Research Ethics Review Committee, School of Graduate Studies, and Research and Publication Office were visited to identify the research works of Master and PhD students from January 2008 to April 2018. Similarly, direct search for records of the Research and Publication Office at the CHMS and electronic search for records of staff grants on the University repository enabled a retrieval of staff grants which were completed or are ongoing researches funded by the University (HURA, 2018c; HURA, 2018d). Apart from these, published literature search was accomplished through advanced search strategy on electronic databases (PubMed, Google Scholar, African Journals Online (AJOL) and HINARI interfaces) for indexed publications. Other supplementary sources including ResearchGate and publications of the East African Journal of Health and Biomedical Sciences were also retrieved through Google Scholar and directly from the journal's online repository (HU, 2016) and/or with direct contact with editor's office, respectively.

For indexed publications, advanced and systematic search strategies were employed to obtain the publications of staff and students of the college. Accordingly, the advanced search resulted in retrieval of 1, 314 total publications which were obtained from PubMed (n=229), AJOL (n=12), Google Scholar (n=815) and HINARI (n=258). On each of the database and/or interface searched for publications, the searches were accomplished with the use of search words or phrases involving "College of Health and Medical Sciences", "College of Health Science", "Haramaya University", and "Ethiopia". Boolean operators (AND, OR and NOT {to exclude College of Veterinary Medicine}) were used appropriately for systematic identification of records for the search in question. The search process was conducted from March to April, 2018 and all published articles available online till the days of data collection were included. In addition, 63 publications were directly retrieved from staff, schools and departments. All of these publications were cross-checked and found available on Google Scholar. Few gray literatures were retrieved through Google Scholar (n=2) that also indexes repositories of some organizations. Publications of the East African Journal of Health and Biomedical Sciences (n=10) were directly accessed through the University website and direct contact of the journal's editor office. Consequently, after duplicate

literatures (n=210), Global Burden of Disease studies (n=30) and published articles in which staff or students of the University did not involve (n=733) were removed by the use of EndNote and the screening by title, abstract and authors, 335 articles were identified as publications of the college from January 2008 to April 2018.

The retrieved data were analyzed thematically by considering years of initiation or publication, sub-themes of the HNW research thematic area, major topics of the research and publication works, staff or students who initiated the works, department or school of the principal investigator or first author, designs of the studies and common journals publishing the researches. These syntheses and analyses of the retrieved research and publication works addressed by the college's staff and students were aligned with topics shortlisted in the framed priority areas of the HNW research thematic area. Descriptive statistics (frequency and percent) were employed for describing the analyses and the results presented in tables and figures. Finally, ethical approval for this study was not considered as it did not involve human subjects.

Results

Research settings of the College of Health and Medical Sciences

Majority of the research works were conducted in Harar, Dire Dawa, several areas in East and West Hararghe zones, and other Eastern parts of the country including Somali Regional State and some areas of the Afar Regional State. Few were also carried out in other parts of the country. A more detail information regarding study settings by year of initiation is indicated in figure 1. As it can be seen from the figure, research themes conducted in Hararghe and Dire Dawa areas highlight an increasing trend over years during the research periods reviewed.

Researches of the college's postgraduate students

The number of research works conducted by master and PhD students were 588 and 24, respectively. Except some irregularities, the research development by these postgraduate students have shown linear increments (Figure 2).

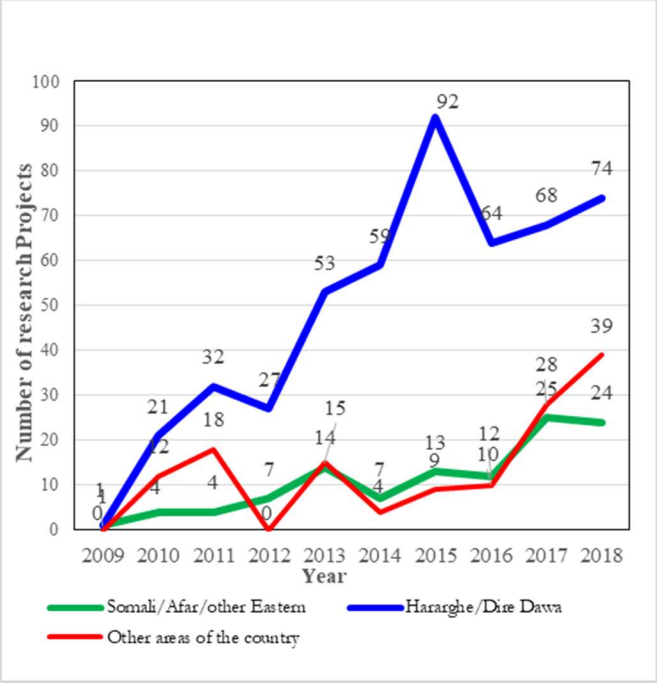

Figure 1: Study settings of CHMS, HU research projects by year initiated, April 2018.

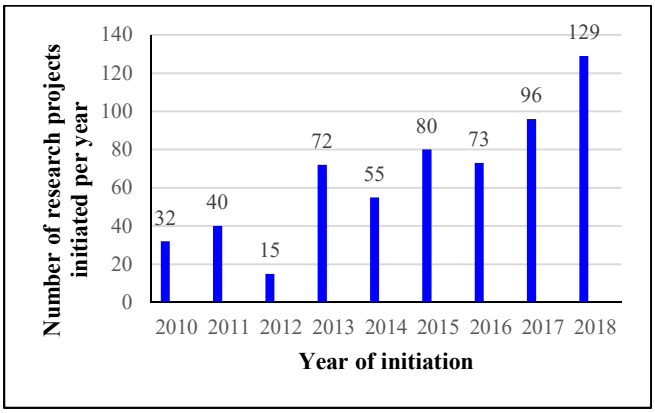

Figure 2: Postgraduate students' researches for CHMS, HU by year of initiation, April 2018.

In line with the college's intake for PhD students, researches initiated by the students has shown to have irregular increment, decrement and sometimes nil. More research works were initiated during the years 2009/10, 2015/16 and 2016/17, but there was no research initiated during the years of 2014 and 2015 (Figure 3).

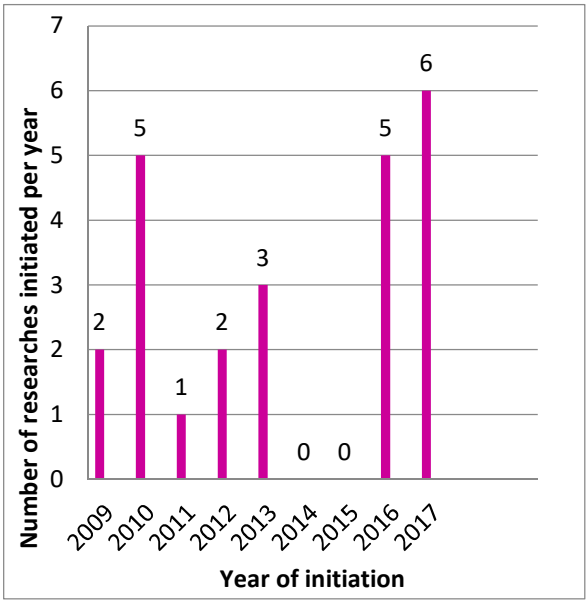

Figure 3: Researches conducted by PhD students of CHMS, HU by year of initiation, April 2018.

Grant researches of the college's staff

By using grants funded by HU, 125 research projects have been accomplished by staff of the college since 2011. Over the years reviewed, highest funding was observed in 2015. The overall trend remained constant during the review years (Figure 4).

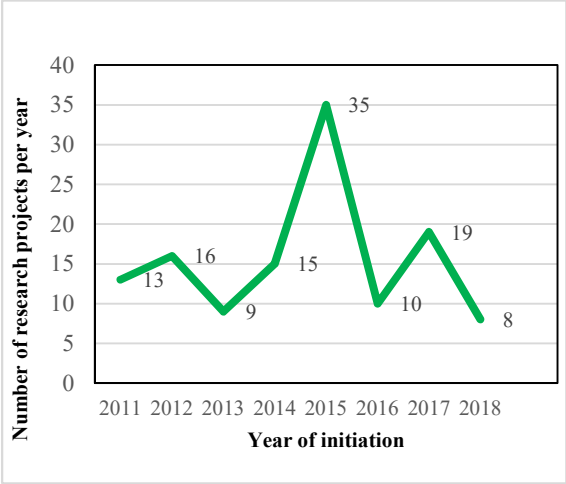

Figure 4: Research grants funded by HU and won by CHMS staff by year of initiation, April 2018.

In the University research grant opportunities, most of the time initiators (principal investigators (PI)) were from the Department of Medical Laboratory Science (won 40 from 125 researches funded) followed by School of Nursing and Midwifery (won 35 from 125 researches funded). Least initiators were from School of Medicine (won 2 from 125 researches funded) and School of Pharmacy (won 5 from 125 researches funded) (Figure 5).

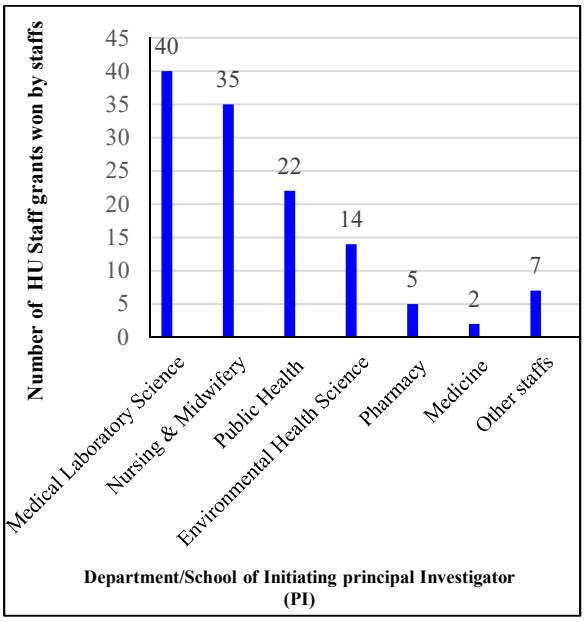

Figure 5: Staff research grants by department/school of initiating principal investigator, April 2018.

Regarding major topics researched by staff, about one third (30.4%) have addressed human immunodeficiency virus (HIV), tuberculosis (TB) including multi-drug resistant TB (MDR-TB) and other infectious diseases. Next to these, 15.2% of the researches focused on non-communicable diseases (NCDs), including cancers, mental disorders, cardiovascular diseases (CVDs), diabetes mellitus (DM) and metabolic syndromes. Majority (90.4%) of the researches had applied descriptive or analytical cross sectional designs of which one-in-five (19.2%) were laboratory based studies. Details of topics addressed and their designs are indicated in Table 1.

Table 1: Major topics and designs of CHMS staff researches granted by HU (n=125), April 2018

Category	Frequencies	Percentage
Research areas (topics)		
HIV, TB and other infectious diseases' exposures, transmissions, diagnoses, treatments and outcomes	38	30.4
Non-communicable diseases (Cancers, mental disorders, CVDs, ADHD, DM and metabolic syndromes)	19	15.2
Medication supply, counseling, utilization, adherence, resistance, ADRs and QoL of patients	9	7.2
Quality of health and medical care services and service utilizations	9	7.2
Adolescent health and their health status assessment	7	5.6
Disease awareness, vaccination for prevention, diagnosis, and treatment	6	4.8
Water, sanitation, hygiene and water-borne diseases	6	4.8
Neonatal, infant and child nutrition, breastfeeding, food security and malnutrition	5	4.0
Professional competency, satisfaction status and misconduct	5	4.0
Dietary diversity or habits, nutritional status, malnutrition and anemia	6	4.8
Reproductive health and birth outcomes	4	3.2
Maternal health, service utilization and role of partner	3	2.4
Traditional, complementary and alternative medicine	2	1.6
Trend analysis for causes of disease and zoonoses	2	1.6
Human milk banking acceptance	1	0.8
Solid waste management	1	0.8
Designs		
Cross sectional studies	113	90.4
Longitudinal or cohort studies	8	6.4
Retrospective cohort studies	4	3.2

Note: ADHD, attention deficit hyperactivity disorder; ADRs, adverse drug reactions; CHMS, College of Health and Medical Sciences; CVDs, Cardiovascular Diseases; DM, diabetes Mellitus; HIV, human immunodeficiency virus; QoL, quality of life; TB, tuberculosis.

Overall, the research done by MPH/MSc students, PhD students and staff had shown an increased linear trend with little fluctuations (Figure 6).

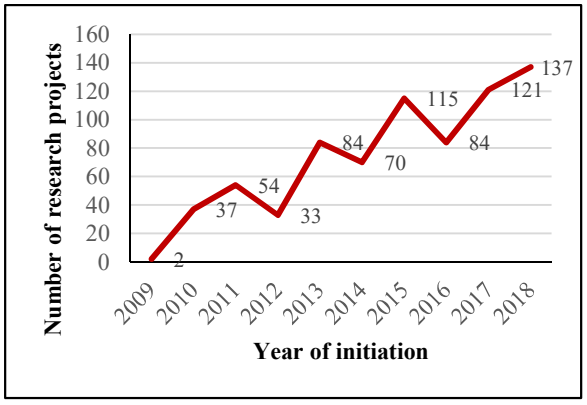

Figure 6: Total research activities of the CHMS staff and students by year of initiation, April 2018.

The review further analyzed the researches done in line with four subthemes (health promotion and disease prevention; advances in curative and rehabilitative health services and disease management; nutrition, food safety, security, and nutritional problems; and reproductive, maternal, newborn, child and adolescent health) under the HNW thematic area. With this, 235 of the researches were categorized under advances in curative and rehabilitative health services and disease management subtheme and 201 of them were under the subtheme of reproductive, maternal, newborn, child and adolescent health. The remaining 190 were under the subtheme of health promotion and disease prevention and 111 were under the nutrition, food safety, security, and nutritional problems subtheme (Figure 7).

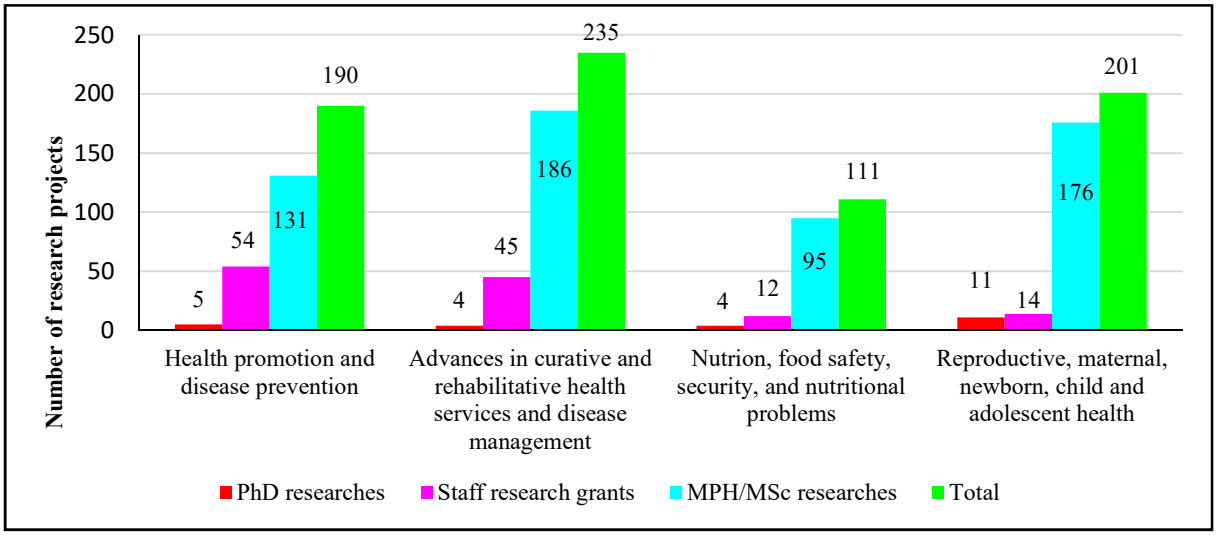

Figure 7: Research projects of the CHMS postgraduate students and staff by subthemes of the HNW research thematic area, April 2018.

Publications of the college's staff and students (January 2008-April 2018).

Since 2008, the number of published works by the staff and/or postgraduate students of the college showed an increasing trend, reaching a maximum of 78 publications per year. In 2018, 29 publications were retrieved until the end of the fourth month (i.e., April) and this number can be extrapolated to more than 100 publications at the end of the year (December 31, 2018). Out of the 335 publications retrieved, 185 (55.2%) are first-authored by staff of the college (Figure 8).

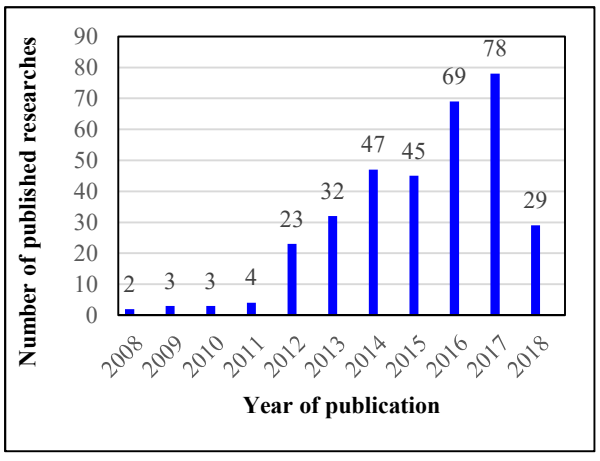

Figure 8: Research publications of staff and students of CHMS, HU by year of publication, April 2018.

Synthesis of major topics and designs for the 335 publications showed that the broad category involved exposures, diagnoses, transmissions, treatments and outcomes of treatments for HIV, TB, and other infectious diseases which accounted for about one-fifths (20.6%) of the publication works. Areas of reproductive health, contraception and contraceptive utilization took the second leading broad areas (11.6%) published. In addition, approximately four-fifths (80.6%) of the publications had descriptive or analytical cross sectional designs. Details of the published topics and their designs are presented in Table 2.

The staff of the college appeared as first-author for 185 publications. Accordingly, the staff of the School of Public Health, School of Nursing and Midwifery, and Department of Medical Laboratory Science were first-authored for 56, 54 and 39 publications, respectively. In addition, the staff of the School of Pharmacy were first authored for 19 publications since February 2014 (Figure 9).

Table 2: Major topics and designs for published articles by staff and students of CHMS, HU (n = 335), April 2018

Category	Frequencies	Percentage
Research areas (topics)		
HIV, TB and other infectious diseases exposure, transmission, diagnosis, treatment outcomes	69	20.6
Reproductive health and contraceptive utilization	39	11.6
Newborn and child health, nutrition (breastfeeding practice), malnutrition, and mortality	30	9.0
Maternal health, nutrition, malnutrition and ANC utilization	24	7.2
NCDs (Cancers, CVDs, DM/GDM, Asthma, common mental disorders, RA, Xerophthalmia, Graves' disease)	22	6.5
Nutritional problems, nutritional insecurity and undernutrition	20	6.0
Traditional, complementary and alternative medicine	19	5.7
Adolescent health and role of parents	15	4.5
Adherence to medications, diet and exercise (ART, IPT, Psychotropic drugs, antihypertensive drugs, lifestyle modification)	12	3.6
Accident (RTA), injuries, trauma and occupational/environmental disease preventions	12	3.6
Drug prescribing, dispensing, utilization, resistance (AMR), and ADR reporting	11	3.3
Healthcare quality, patient satisfactions and service utilizations	11	3.3
Substance use and consequences (alcohol, khat, tobacco, and others)	10	3.0
Water, hygiene, sanitation, water pollution, and diarrhea	10	3.0
Food technology (value adding or preservation)	9	2.7
Nutritional status, iodine/mineral deficiencies and anemia	9	2.7
Chronic Liver Disease and Hepatitis	4	1.2
Vaccination, immunity status and autoimmune diseases	4	1.2
Health and Demographic Surveillance report	2	0.6
Waste management	2	0.6
Neglected disease (Podoconiosis)	1	0.3
Designs		
Cross sectional studies	270	80.6
Case control studies	39	11.6
Retrospective cohort studies	12	3.6
Longitudinal or cohort studies	8	2.4
Reviews (systematic or meta-analysis)	6	1.8

Note: AMR, antimicrobial resistance; ADRs, adverse drug reactions; ART, antiretroviral therapy; CVDs, Cardiovascular Diseases; DM, Diabetes Mellitus; GDM, Gestational Diabetes Mellitus; HIV, human immunodeficiency virus; IPT, isoniazid prophylactic therapy; RA, rheumatoid arthritis; RTA, road traffic accident; TB, tuberculosis

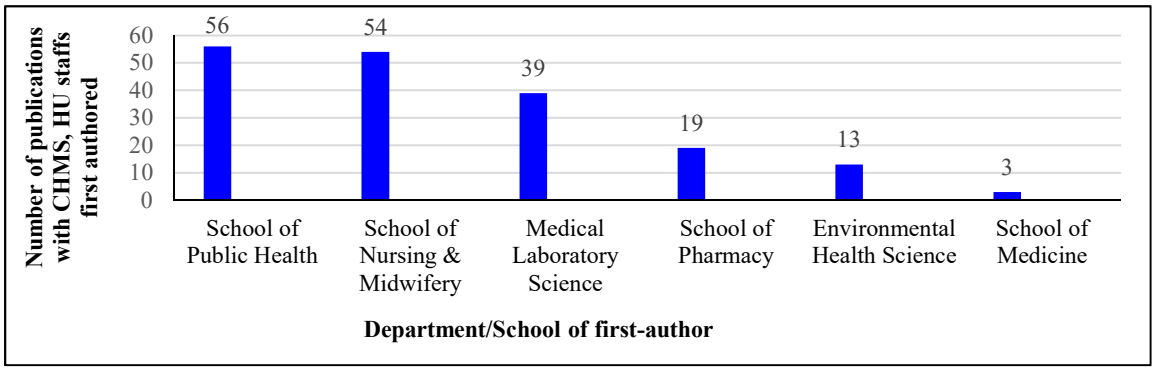

Figure 9: First author staff of CHMS, HU publishing research works by their school/department, April 2018

Regarding the common journals or publishers archiving the college's research works, nine top publishers which published about 165 of the 335 publications were synthesized. With this, the first five leading journals/publishers by the number of articles they have archived were Springer Nature (which publishes BMC journals) (n=66), PLoS One (n=25), Dove Medical press (which publishes Dove press journals) (n=20), Pan African Medical Journal (n=19), and East African Journal of Health and Biomedical Sciences (n=10) (Figure 10).

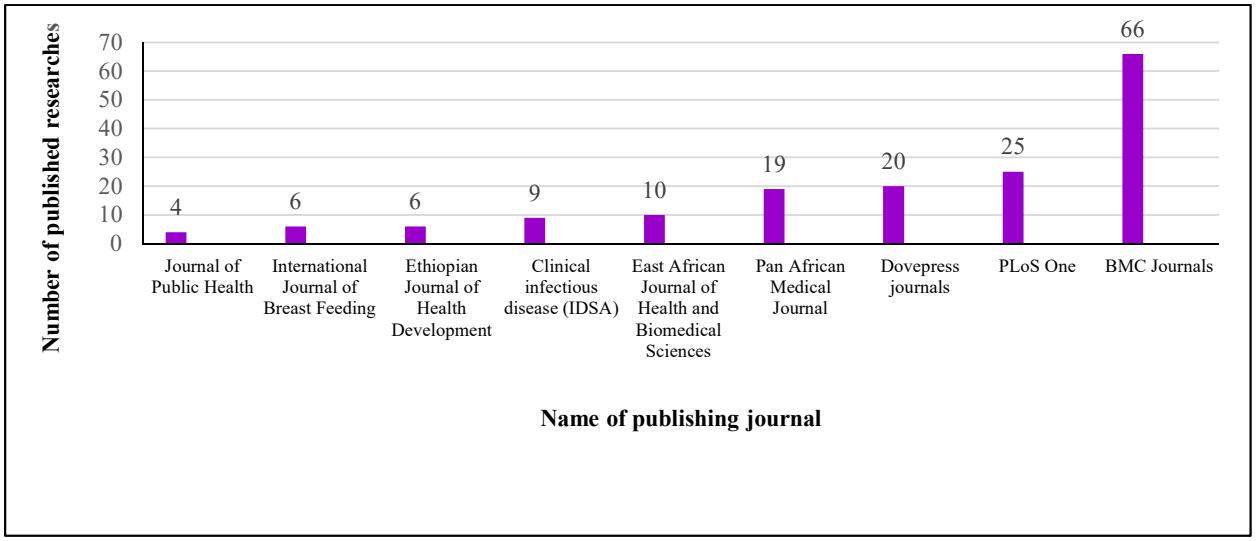

Figure 10: Leading publishers/journals for CHMS, HU researches by the number of articles archived in their repository, April 2018.

Discussions

The present analysis identified 737 researches done and 335 publications. The major topics addressed were mainly HIV, TB and other infectious diseases. Descriptive/analytical cross sectional methods were the frequent designs applied. The research development of the college showed an increasing trend over the last decade. This ever increasing research development is largely related with the increasing number of staff and intake capacity of postgraduate studies and emphasis made toward solving health problems of the community by allocating regular and special research grants where young faculty research grants and big research funds were among the initiatives that the University took during early years of this review period. Following these initiatives, the research grant calls of the University/college has become to be guided by research priority areas that have been framed and updated based on the changing international or national agenda, demands of local community and sectoral offices, research policy reviews, and recommendations of researchers. To this end, six research thematic areas were identified and the HNW (designated as Theme II) is one of the thematic area which in turn encompassed four subthemes for ease of guiding research activities. Despite the availability of thematic areas and clear list of topics that demand researching within the theme and its subthemes, staff from different disciplines have not been equally engaged in research activities. For example, Pharmacy field and clinical Medicine were less researched. This could be related to few experts in the fields and the research experience is minimal which usually made them less to win as best research proposals are being granted based on the thematically and/or centrally pooled competitions (HU, 2018b). Interestingly, this review identified that research works and publication outputs from postgraduate students and staff are significantly developing over time and becoming main pillar of generating evidence that can be applied at different levels. Similar experiences have been also documented in other institutions in Ethiopia and other African countries.

Most topics of the research works identified by this review were within the framework of research priority areas that have been updated annually in response to changing international or national agenda, demands of local community and sectoral offices, research policy evaluations and recommendations of researchers. In alignment to this research framework, HIV, TB, and other infectious diseases and NCDs, including mental disorders, CVDs, DM, cancers and metabolic syndromes were the key topics that the staff researches had mainly addressed (45.6%). Other several topics were also focused by the research works but 90.4% of them had descriptive/analytical cross sectional designs. This design might be weak in generating strong evidence to give policy recommendations and to indicate interventions that can solve health problems of the community (Petrisor and Bhandari, 2007). Similarly, topics of published works mainly focused on HIV, TB, and other infectious diseases, followed by reproductive health and contraceptive utilization. The changing national and international policies with regard to HIV and TB such as ending TB by 2030, increased HIV/AIDS spending for its prevention and treatment (Dieleman *et al*., 2018a) and universal health coverage index performance (Dieleman *et al*., 2018b) had parallel inputs to wide coverage of such topics in the college's research and publications. Descriptive/analytical cross sectional designs were the frequent methods applied for the published works. The number of published works with a relatively higher strength of evidence such as systematic reviews and meta-analyses, cohort and case-control studies were minimal despite their good or fair strength of generating evidence compared to the descriptive studies (Mithun Pai *et al*., 2012, David, 2003, Murad *et al*., 2016).

This synthesis also identified that areas that are identified by the University as per the research thematic framework shortlisted under Theme II were not fully explored. Importantly, health effects of wastes, toxicological effects of herbicides or pesticides commonly used by farmers, burden of diseases related with waste water irrigation, and food-borne zoonotic diseases remained unaddressed from the subtheme of health promotion and disease prevention. Similarly, the research works that design efficient approaches for pharmaceutical services that assist in identifying adverse drug effects related with polypharmacy, culture of information use and approaches for emerging and neglected health problems are research duties that are pending to be researched from the advances in curative and rehabilitative health services and disease management subtheme. Moreover, nutritional intervention approaches for NCDs, policy and regulatory issues of food adulteration, nutritional intervention and its impacts on child growth and development, nutritional concerns and gerontology, impacts of information technology on adolescent health, and abuse of orphans or street children are not yet addressed from the dietetics and nutritional safety, security and problems and the reproductive, maternal, newborn, child and adolescent health subthemes.

About half (n=165; 49.2%) of the publications were published and archived in nine of open access scholarly journals/publishers. Legitimate database indexing services including PubMed indexation; genuine peer-review processes; consideration of waiving for article processing charges; user-friendly online submission processes and reputability of majority of the journals were some of the key reasons for their preferences (Springer Nature, 2018a; Springer Nature, 2018c; Springer Nature, 2018b; Dove Medical Press, 2016). Some journals of Dovepress also have fast track peer-review processes for publication in addition to their PubMed indexation and reputability why people usually opt to send their publications (Dove Medical Press, 2016). Anyway, the first four journals which have been publishing the college's research works have indexation in the world's largest medical library (MEDLINE). On the other hand, we have not observed publications of the college's archival in well-known and highly reputable journals such as New England Journal of Medicine, Lancet, and Nature, among others; all of which have wide media coverage for their contents to come into policy attention. This might indicate that methodological strength of our research works could have been weak and future studies need to seriously consider in undertaking methodologically strong studies.

More than half (n=185; 55.2%) of the published articles were first authored by staff. Visibility to

scientific communities through reputable databases like MEDLINE/PubMed seems the key motive for some of the authoring staff of the college. However, as it was observed, the publishing culture is still minimal. This can be seen by comparing the number of research works initiated in the college (i.e., 737 researches) with the number of publications retrieved (i.e., 335 articles).

Despite the exhaustive record screenings and systematic searches of legitimate databases or indexing services, this review analysis has some limitations. First, undergraduate research works which were part of the college's research activities were not considered. Second, the research works of the college that were not previously registered by the Research and Publication Office, Institutional Health Research Ethics Review Committee Office, School of Graduate studies and in repository of the University were not retrieved. Finally, the publications that were only indexed in the major electronic databases (PubMed, Google scholar, and AJOL), HINARI interfaces and some direct search of gray literatures including articles of the college's East African Journal of Health and Biomedical Sciences and submitted publications to research offices from some staff were considered. This means that journals which index their publications in databases with restricted access were not retrieved. Therefore, interpretation of this review findings should be made in consideration of the aforementioned limitations. The publication metrics also works up to the final day of data gathering (April 2018) and after which any published or unpublished work was not included.

Conclusions

Overall, the research development and publications of the college has been constantly rising over the period reviewed though there were some irregularities. It was figured out that the staff were not equally engaged in hunting grants for research and few staff were frequently publishing their research work. Main topics addressed in major were infectious diseases, including HIV and TB and majority of the works had cross sectional designs. Research and publication activities accomplished so far were in alignment with the thematic priority calls of the University though there are areas that are not still addressed. With the studies, important public and clinical health findings were identified. Therefore, decision and policymakers are advised to consult these researches and researchers are recommended to focus on stronger methodologies that include unaddressed aspects.

Acknowledgements

The authors thank Haramaya University, College of Health and Medical Sciences, Institutional Health Research Ethics Review Committee coordinating office, Research and Publication Office, Department of Medical Laboratory Sciences, and School of Graduate Studies, without them this work would not be realized.

Conflict of interest

The authors declare that they have no conflict of interest.

Authors' contribution

DE conceived and designed the review, conducted data collection and analyzed, interpreted and wrote-up the data. MS and YD designed the review and analyzed, interpreted and wrote-up the data. DE and MS wrote the first draft of the manuscript; DE prepared the final version of the manuscript. All authors read and approved the final manuscript.

References

David, B.N. 2003. Hierarchy of evidence: framework for ranking evidence evaluating healthcare interventions. *Journal of Clinical Nursing,* 12(1): 77-84.

Dieleman, J.L., Haakenstad, A., Micah, A., Moses, M., Abbafati, C., Acharya, P. 2018a. Spending on health and HIV/AIDS: domestic health spending and development assistance in 188 countries, 1995–2015. *Lancet,* 391(10132): 1799-829.

Dieleman, J.L., Sadat, N., Chang, A.Y., Fullman, N., Abbafati, C., Acharya, P. 2018b. Trends in future health financing and coverage: future health spending and universal health coverage in 188 countries, 2016–40. *Lancet*, 391(10132): 1783-98.

Dove Medical Press. 2016. Why Publish with Dove medical Press? *Dovepress,* doi: https: //www.dovepress.com/why_publish_with_dove.php?content_id=3044 (accessed September 19, 2018).

HU (Haramaya University). 2015. College of Health and Medical Sciences distributes 1,000 Tablet Computers. *Haramaya University,* http://www.haramaya.edu.et/college-of-health-and-medical-sciences (accessed April 11, 2019).

HU (Haramaya University). 2016. East African Journal of Health and Biomedical Sciences. *East African Journal of Health and Biomedical Sciences,* 1 (1): 1-51.

HU (Haramaya University). 2018a. College of Health and Medical Sciences: Historical background and main achievements. *Haramaya University,* doi: http://www.haramaya.edu.et/academics/College-of-health-and-medical-sciences/ (accessed April 21, 2018).

HU (Haramaya University). 2018b. College of Health and Medical Sciences: Schools and Departments. *Haramaya University,* http://www.haramaya.edu.et/academics/college-of-health-and-medical-sciences/schools-departments (accessed April 12, 2019).

HURA (Haramaya University Research Affairs) 2018a. Research themes. *Haramaya University*, doi: http://research-affairs.haramaya.edu.et/?page_id=369 (accessed April 21, 2018).

HURA (Haramaya University Research Affairs) 2018b. All registered projects. *Haramaya University.*doi:http://www.213.55.85.92/resear-ch/projects/.

HURA (Haramaya University Research Affairs) 2018c. HU completed projects. *Haramaya University*, doi: http://researchaffairs.haramaya.edu.et/?page_id=2159 (accessed April 21, 2018).

HURA (Haramaya University Research Affairs) 2018d. HU ongoing projects. *Haramaya University*, doi: http://researchaffairs.haramaya.edu.et/?page_id=2161 (accessed April 21, 2018).

Mengistu, F. M. 2018. Theme II: Human Health, Nutrition, and Welfare. *Haramaya University,* doi: http://researchaffairs.haramaya.edu.et/-?page_id=518 (accessed September 21, 2018).

Mithun Pai, B.H., Rajesh, G. and Shenoy, R. 2012. Research design hierarchy: Strength of evidence in evidence-based dentistry. *Journal of Interdisciplinary Dentistry,* 2 (3): 158-163.

Murad, M.H., Asi, N., Alsawas, M. And Alahdab, F. 2016. New evidence pyramid. *Evidence-Based Medicine,* 21 (4): 125-127.

Petrisor, B.A. and Bhandari, M. 2007. The hierarchy of evidence: Levels and grades of recommendation. *Indian Journal of Orthopaedics,* 41(1): 11-15.

Springer Nature. 2018a. Advancing peer review at BMC. *BioMed Central Ltd,* doi: https://-www.biomedcentral.com/about/advancing-peer-review (accessed September 19, 2018).

Springer Nature. 2018b. Publication costs. *BioMed Central Ltd,* doi: https://www.biomedcentral.com/about/publication-costs-and-funding (accessed September 19, 2018).

Springer Nature. 2018c. We're the pioneers of open access publishing. *BioMed Central Ltd,* doi:https://www.biomedcentral.com/about/open-access (accessed September 19, 2018).