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Health promotion and harm reduction attributes in One Health literature: A scoping review

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ABSTRACT

One Health faces enormous pressure and challenges as it attempts to mitigate dynamic, surprising and complex global events that threaten the health and sustainability of human and animal populations and the biosphere. One Health practitioners and researchers need every advantage to developing working solutions to the world's imminent complex issues. Heath promotion and harm reduction, interrelated approaches that have seen much success over decades of use in global public health, may be important models to consider. Both use an upstream socioecological determinant of health approach to reach beyond the health sector in all health efforts, and encourage active community participation and empowerment to attain and sustain human and ecological health. This scoping review of 411 documents, believed to be the first to relate health promotion and harm reduction to One Health, searched self-declared One Health research literature for evidence of health promotion and harm reduction policies, principles and methodologies. It sought to answer the questions: "What is the scope of practice of One Health in self-declared One Health publications?" and "Are attributes of health promotion and harm reduction found in self-declared One Health-reviewed research literature?" Over half of the papers revealed no health promotion or harm reduction attributes while 7% were well-endowed with these attributes. These 7% of papers focused on deep-seated, complex health issues with systemic knowledge gaps and decision-making issues revolving around specific population vulnerabilities, social inequities and competing stakeholders. Implementing 'on the ground change' was a common theme in the strongest health promotion/harm reduction papers we identified. Alternatively, papers lacking health promotion or harm reduction attributes focused on managing proximate risks, primarily for infectious diseases. The addition of health promotion and harm reduction to One Health practices may help the field rise to the growing expectations for its involvement in complex global issues like pandemics and climate change.

1. Introduction

Health promotion and harm reduction have been widely recognized for their utility and success with public and population health issues for decades [1,2]. These interrelated approaches share concepts and methods that empower people to influence their life's circumstances for better health. Health promotion is rooted within systems thinking and resiliency and represents a forward-thinking approach to advocating for and protecting health by supporting population's coping capacity. It recognizes the reciprocal maintenance of health between humanity and the environment whereby both entities are inextricably linked and interdependent. Harm reduction is a subset of health promotion. It is a pragmatic approach to public health problems that focuses on reducing the effects of a persistent harm(s) without necessarily eliminating the offending harm. Their focus on collaborative approaches to interacting determinants of health seem to make these well-known population health concepts suited to One Health. This scoping review examined One Health literature to assess if and how health promotion and harm reduction have been used in research and action.

One Health has had success in infectious disease control and prevention [3], comparative clinical medicine [4,5] and food safety and security [6]. However, pressure and expectation for One Health are rapidly escalating as societies face more complex challenges like climate change and global pandemics. The COVID-19 pandemic provided a stark example

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of the urgent action needed to address surprising, hyperdynamic and crippling events. The COVID-19 pandemic had profound, immediate effects with significant ripple effects likely to follow in the coming years and decades [7]. Comprehensive and collective approaches will be needed to overcome its social and ecological consequences. It is widely acknowledged that the Anthropocene will herald greater, potentially more troubling, disruptive surprises [8,9]. One Health has been repeatedly called upon by the World Health Organization, World Bank, World Organization for Animal Health, Food and Agriculture Organization, United Nations Environment Programme [10] and world leaders to provide working solutions pertinent to COVID-19, and other existing 'wicked' global problems [11] like climate change, antibiotic resistance and planetary sustainability [12]. The growing expectations for One Health to better equip humanity for a rapidly changing future raises the question: Is contemporary One Health fully armed and prepared to face these challenges by enabling and facilitating necessary change for a healthier and safer world?

Health promotion and harm reduction serve distinctive but complementary purposes. Health promotion incorporates the notion of reciprocal care between society and the natural world and focuses on socioecological determinants for a holistic approach to health and wellness for individuals and communities. Harm reduction is an 'action arm' of health agendas and serves to generate actions for individuals and communities to 'own' their responses to complicated health challenges.

Health promotion is "The process of enabling people to increase control over, and to improve, their health" [13]. It empowers individuals and communities to participate in health efforts to meet needs, cope and adapt to changes and build resilience. It goes beyond the provision of health care and recognizes that health is not just the responsibility of the health sector, but is instead reliant on certain conditions and resources like "peace, shelter, education, food, income, a stable eco-system, sustainable resources, social justice, and equity" [13]. Health promotion sees the need to simultaneously focus on ecological and social determinants of health and in doing so, works to protect and conserve critical natural ecosystems [14].

Health promotion is multi-level and multi-sectoral, bridging public and private entities to meet its goals. It is meant to be highly participatory, with individuals and communities advocating and working towards their own health. This approach moves beyond individual behaviors and supports social and environmental interventions. Health promotion is directed towards priority health conditions involving large populations. It is issue-based and settings-based, recognizing the unique contextual features of a health challenge in a given location [15].

Harm reduction served originally as a successful public health response to problems of addiction [16]. It does not demand that the hazard causing harm is eliminated, but rather seeks to implement interventions to make a situation incrementally safer and healthier by collaboratively confronting the suite of social, personal and other harms incited by the hazards. Harm reduction tackles a problem at its current situation, to initiate immediate action to the greatest needs. In this way harm reduction takes a pragmatic approach to decreasing harm in applying effective, practical solutions to health challenges [17]. It meets people 'where they are' with a problem and takes incremental steps in the right direction to minimize harmful effects to individuals, communities and systems. It works on meeting goals in a hierarchical manner, achieving the most immediate and realistic goals first [18]. A central premise is that it invites and involves all stakeholders of a problem to explore and implement actions to reduce harms, therefore it is highly participatory. Harm reduction supports grass-root efforts to engage with public and private experts and authorities. Like health promotion it involves all individuals and sectors involved with a problem to participate in working towards a solution, so it is multi-level, multi-disciplinary and empowers people to take control of their health and lives. Harm reduction is fluid and dynamic, allowing flexibility as people and problems fluctuate. This can be divergent with some approaches that get stagnated by the need to gather an irrefutable body of evidence before interventions are authorized to proceed. Lastly harm reduction recognizes that human behaviors, their associated harms and proposed solutions are highly dependent on socially constructed belief systems and culture within a setting, so like health promotion, harm reduction is greatly contextual in nature.

Health promotion and harm reduction concepts and methods align well with expectations for One Health to focus on upstream social and ecological determinants of global health challenges affecting people, animals (domestic and wild) and the environment we share. In this paper, we undertook a scoping literature review to examine self-declared One Health research literature to characterize the expanse and nature of One Health research and see if or how health promotion and harm reduction concepts have been used. We sought to understand if One Health problems may benefit from the comprehensive determinant of health approach we find in health promotion and harm reduction, and if there is an opportunity space for these upstream approaches in the One Health scope of practice.

2. Methods

2.1. Scoping review protocol, team and question

A scoping review "map(s) the literature on a particular topic or research area and provide(s) an opportunity to identify key concepts; gaps in the research; and types and sources of evidence to inform practice, policymaking, and research" [19]. This review followed an a priori 3-part protocol. It draws on Arksey and O'Malley's seminal 5-stage methodological framework for scoping reviews [20]. The PRISMA-ScR protocol was followed [21]. The review team consisted of 2 veterinarians and 1 ecologist with expertise in veterinary/public health, population health, epidemiology, ecology and knowledge-synthesis methods. This review was guided by the questions, "What is the scope of practice of One Health in self-declared One Health publications?" and "Are attributes of health promotion and harm reduction found in self-declared One Health-reviewed research literature?" Attributes were sought from peer-reviewed papers, textbooks, and government and professional websites.

The scoping review process is shown in Fig. 1.

2.2. Search strategy

Publications were obtained by one researcher using two databases, PubMed [22] and Scopus [23]. PubMed is a premier database for medicine and biomedical science literature and Scopus indexes journals in science, technology, medicine and social sciences [24]. The literature was initially searched for publications using the term One Health in the title. Included were original quantitative and qualitative studies and reviews published in English between January 1, 1990 and May 31, 2018. Duplicate documents were eliminated as were articles that included the words "one" and "health" but not with respect to the concept of One Health.

2.3. Step 1

2.3.1. Scope of practice found in One Health abstracts

The abstracts of all included papers ($n = 439$) were reviewed by one investigator and the following was recorded on a data characterization extraction form 1: theme of the article, species of concern, stakeholders involved, main health concerns, geographical location (when applicable) of the study and challenges and/or outcomes. More than one item per category could be chosen. The objective was to frame the One Health literature by describing its scope of practice.

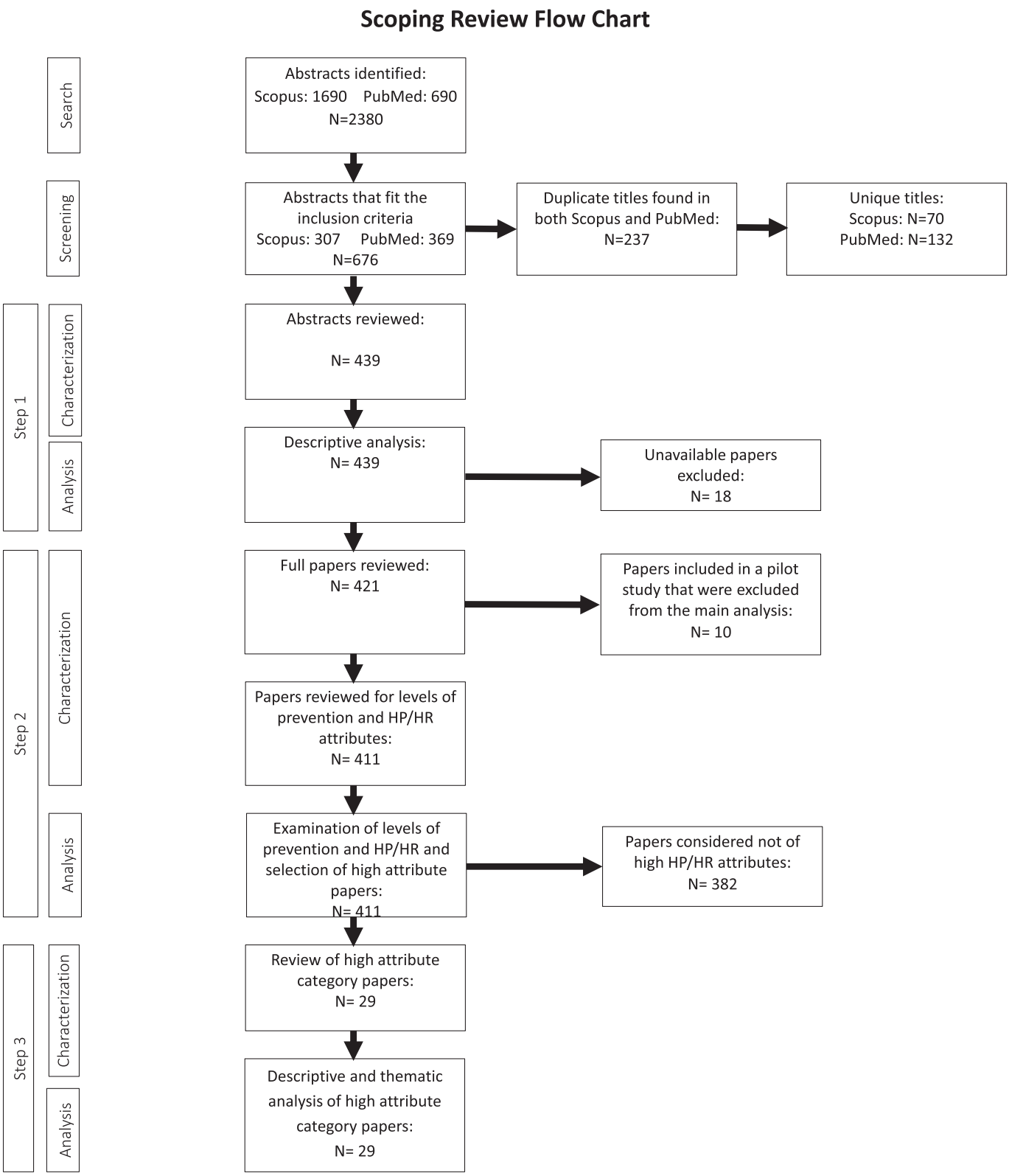

Fig. 1. The scoping review process of identified One Health publications to describe scope of practice and use of health promotion and harm reduction attributes in One Health.
Health promotion and harm reduction are represented in the chart as HP/HR.

2.4. Step 2

2.4.1. Characterization of health promotion and harm reduction in One Health

This step was designed to answer the questions: "Are elements of health promotion and harm reduction found in One Health literature"? "Are One Health researchers working in the realm of health promotion and harm reduction"? From the 439 abstracts, 421 full papers were procured. A data characterization extraction form (DCE 2) listing 10 health promotion and 11 harm reduction attributes was created. These attributes were extracted from textbooks and review articles describing these fields and were distilled by selecting those attributes common across sources and relevant to the One Health realm based on the experiences and opinions of the investigators. This latter step was necessary as there was no pre-existing evaluation tool to assess health promotion and harm reduction in One Health (see Table 1). The form assigned levels of prevention used in public health to each of the papers. Levels of prevention are used in public health as health measures to target each stage in the natural progression of disease, and each corresponding level reflects a different goal. The levels aim to prevent: development of unhealthy circumstances (primordial); acquisition of risk factors (primary); transition of sub-clinical to clinical disease (secondary) and premature death or long-term illness (tertiary) (See Fig. 2). [25]. A nominal scale was used for the attributes and levels of prevention, whereby each of the 21 attributes and four levels of prevention was present or absent. More than one level of prevention could be chosen for each paper.

Before applying DCE 2 to the 421 papers, a subset of 40 was randomly chosen. The first 10 of the 40 were given to two researchers to test the applicability and understandability of the data characterization form. Disagreements were discussed, the process refined and the 10 piloted papers were subsequently eliminated from the final data set. Reviewing continued on the remaining 30 papers independently. A 75% interrater agreement was reached between the two researchers on the 30 papers. Papers on which the reviewers disagreed were examined to rule out systematic bias. The remaining 381 papers were randomly and equally assigned to both reviewers.

An arbitrary categorization system was developed for the 21 health promotion/harm reduction attributes as follows: zero attributes, low (1–7 attributes), medium (8–14 attributes) and high (15–21 attributes). The distribution of attributes were visualized in histograms and assessed for trends and patterns by all authors for which there was 100% agreement. Papers with the highest number of health promotion and/or harm reduction attributes were selected for further analysis by selecting the papers with: 1) the highest number of combined attributes (21 attributes), 2) the highest number of health promotion attributes only (10 attributes) and 3) the highest number of harm reduction attributes only (11 attributes).

2.5. Step 3

2.5.1. Assessment of how health promotion and harm reduction attributes were applied in One Health

An analysis was applied to the 29 papers categorized in the high category in step 2. It was guided by four questions: 1) What problem was being addressed? 2) What aspect(s) of the problem was targeted for change or influence? 3) How was change affected? 4) Was the project successful? Information was recorded on: specific topic/problem, goals/objectives, major stakeholders involved, geographical location, rationale for approach, methodology, feasibility, success and challenges/barriers.

A descriptive analysis of the high attribute papers was performed to explore the scope of practice of papers working in the spectrum of health promotion and harm reduction.

Table 1
Health promotion and harm reduction attributes and categorization of 411 self-declared One Health publications.

	Categorization					
Health Promotion Attributes	Low		Medium		High	
1. Broad holistic focus on health which deals with the capacity to be healthy and resilient	No.	%	No.	%	No.	%
a) Does it include issues/information regarding the fundamental conditions and resources of health? (peace, shelter, education, food, income, stable ecosystem, sustainable resources, social justice and equity)	32	25.6	31	73.8	17	100
b) Does it focus on building capacity/options for action in advance of harms to health to cope with stressful situations?	27	21.6	30	71.4	17	100
c) Does it satisfy people's/animal's needs, fulfill expectations of health and allow people/animals to cope with change?	31	24.8	31	73.8	15	88.2
2. Based on the socioecological model and deals with upstream drivers of health						
a) Does it encourage reciprocal maintenance? (taking care of individuals, groups of populations AND their environment?	24	19.2	28	66.7	12	70.6
b) Does it move beyond clinical services and work to prevent the development of risk factors of disease by addressing underlying socio-cultural, political, economic, environmental conditions that drive disease?	33	26.4	32	76.2	17	100
c) Does it work to protect the natural and built environment and conserve natural resources?	35	28.0	29	69.0	13	76.5
3. Multi-sectoral involvement and coordination						
a) Does it show collaborative action involving many sectors including those working outside of the traditional veterinary health sector? (i.e. Government, health sector, social/economic sector, local authorities, industry, media, non-governmental organizations and voluntary organizations)	41	32.8	25	59.5	14	82.4
4. Participatory community action striving to achieve health in a particular setting						
a) Do local people in a particular setting come together to work for health?	19	15.2	11	26.2	13	76.5
b) Has there been collaborative approaches to set priorities, make decisions and plan/implement towards health?	8	6.4	9	21.4	13	76.5
c) Are people given appropriate information, learning opportunities and funding to support the health actioning?	2	1.6	4	9.5	9	52.9
	Categorization					
Harm Reduction Attributes	Low		Medium		High	
1. Reduces the effects of a persistent harm (social, biomedical, environmental) without necessarily eliminating the harm itself	No.	%	No.	%	No.	%
a) Is there a persistent harm affecting a population of people or animals?	60	48.0	38	90.5	17	100
	59	47.2	38	90.5	17	100

(continued on next page)

Table 1 (*continued*)

Harm Reduction Attributes	Categorization					
	Low		Medium		High	
b) Were actions taken to help people/animals live safer healthier and more sustainable lives without eliminating the harm? (this can include actions to increase coping capacity and/or minimize the effect)						
2. Collective action in the face of conflict and uncertainty						
a) Was there participatory action of individuals/groups, including the involvement of multiple stakeholders?	38	30.4	23	54.8	17	100
b) Were actions taken on the issues stakeholders could agree on despite stakeholder conflict and scientific uncertainty?	4	3.2	12	28.6	15	88.2
c) Did planning and action involve the community working with experts and government?	14	11.2	19	45.2	15	88.2
3. Pragmatic, settings approach-meeting the people and problem 'where it is at'						
a) Were realistic achievable steps taken that considered the context of the situation?	4	3.2	14	33.3	14	82.4
b) Were the actionable steps done incrementally, addressing the most immediate and realistic goals first?	1	0.8	13	31.0	12	70.6
c) Was the problem addressed from its most current state, using available knowledge and resources?	9	7.2	14	33.3	14	82.4
4. Non-judgmental attitude towards people and the problem						
a) Were the people/animals involved in the problem treated with dignity and respect?	6	4.8	13	31.0	14	82.4
b) Was the problem handled in a manner that was non-judgmental?	4	3.2	8	19.0	14	82.4
c) Were the people involved with the problem given all available options-including the option of doing nothing? (self-determination)	0	0	1	2.4	4	23.5

Table 1. Legend: 'No.' in the table refers to the number of papers and their corresponding percentages. Papers were placed into low, medium and high categories based on their number of health promotion and harm reduction attributes.

3. Results

3.1. One Health abstracts

A final selection of 439 articles was obtained from the 2380 publications retrieved from the literature search. The 439 abstracts are characterized in Table 2. Disease prevention represented 67% ($n = 294/439$) of the themes of the papers. Zoonotic disease were 55% ($n = 243/439$) of the mentioned health issues. Academics were the highest represented stakeholders at 65% ($n = 283/439$) with government/policy-makers at 27% ($n = 119/439$) and local residents at 18% ($n = 80/439$). Worldwide applications of One Health were found in 50% of the papers ($n = 218/439$), while the remainder focused on specific regions of the globe. Of the specific themes revolving around challenges and outcomes expressed within the papers, academic knowledge (outcome) was most prevalent at 68% ($n = 300/439$), followed by collaboration (challenge) (39%; $n = 170/439$) and implementation (challenge) (24%; $n = 105/439$).

3.2. Level of prevention

Interventions depicted in the 411 papers were categorized by their level(s) of prevention (primordial, primary, secondary and tertiary) (Refer to Fig. 2 to recall the 4 levels of prevention). Of those that could be categorized, primordial elements were found in 31% ($n = 129/411$), 47% ($n = 193/411$) had primary prevention elements, 22% ($n = 92/411$) had secondary and 6% ($n = 25/411$) contained tertiary (Fig. 3). More than one level of prevention could be chosen where appropriate or none if the level of prevention was not determined.

3.3. Health promotion and harm reduction attribute distribution

Over half of the 411 papers (55%; $n = 227/411$) had no health promotion and harm reduction attributes (Fig. 4). Only 7% of the papers ($n = 29/411$, inclusive of the 12 highest health promotion attribute only and harm reduction attribute only papers) scored in the high category for attributes (Table 1). The attributes that were weakly demonstrated in the high category papers were Health Promotion 4c: *Are people given appropriate information, learning opportunities and funding to support the health actioning?* and Harm Reduction 4c: *Were the people involved with the problem given all available options, including the option of doing nothing?* Other health promotion and harm reduction attributes were common (70–100%) in the papers ranked in the high category.

Health promotion and harm reduction attributes were found in papers that ranked in the low category (Table 1). The low and high attribute papers overlapped the most with the harm reduction attribute of *reducing the effects of a persistent harm*, where the low category was about 50% and the high at 100%. Collaborative actions were present in about 30% of the papers in the low attribute category.

3.4. Descriptive analysis of 29 high attribute category papers

Examination of these well-endowed papers revealed one predominate theme: taking collective action in the face of health threats. The majority of these described projects and programs were initiated to gain perspective and participation to affect action, and foster individual and community empowerment.

The One Health problems in these papers were mostly deep-seated, chronic, complex priority health issues with known systemic knowledge gaps and decision-making needs. Sixty-six percent ($n = 19/29$) were infectious disease focused. The issues commonly revolved around specific population vulnerabilities and social inequities and tended to have diverse, competing stakeholders. Disputes between involved parties were often socially, economically and/or politically charged. They were typically dynamic issues fraught with scientific uncertainty and unintended consequences were a noted concern. Lastly, 86% of the papers ($n = 25/29$) were settings-based and described problems and issues within a specific country or region.

These papers used systems-based approaches and focused on upstream social and ecological determinants. In 62% ($n = 18/29$) of the papers, the performed work was described as expert-driven, but with a palpable and necessary emphasis on community engagement and participation. Cross-disciplinary expertise was mentioned in the majority of papers (66%; $n = 19/29$) with inter- or trans-disciplinary means mentioned frequently (38%; $n = 11/29$) and with higher regard. Anecdotely, the context of problems within the papers was considered heavily with specific vulnerabilities and capacity for people and places repeatedly mentioned as well as relative sociocultural and socioeconomic components. Timing of One Health efforts was an important deliberation in 9/29 (31%) studies and projects. Understanding or taking into account the cultural and economic context of the problems was a common theme of these papers. Although these papers frequently prioritized human concerns, the majority (72%; $n = 21/29$) also demonstrated simultaneous efforts towards animal and/or environmental health.

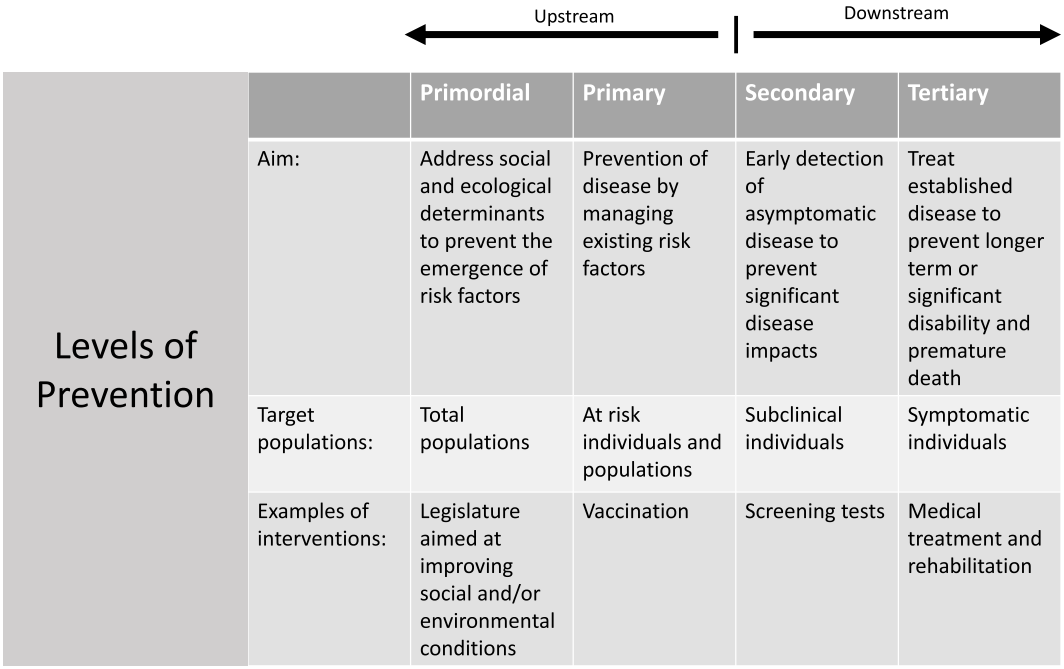

Fig. 2. Characteristics of levels of prevention used in public health.

High attribute papers espoused a common desired end result: the creation of flexible, transparent and adaptable programs or systems that will function to integrate knowledge and promote resilience, sustainability, inclusion and social justice. The vast majority (93%; $n = 27/29$) reported success with their respective One Health endeavors. Success was reported within the publications or inferred by the researchers if the aims and objectives of their activities were met.

4. Discussion

We show that health promotion and harm reduction concepts are being used to address One Health problems. While this literature only represented 7% of the literature we scrutinized ($n = 29/411$), it lends credence to the proposition that One Health researchers are finding that health promotion and harm reduction principles and methodologies align with their efforts regarding global priority health issues. Although the terms health promotion and harm reduction appeared to the investigators to be rarely used in this literature, some researchers found their associated principles and attributes feasible, useful and successful in actioning mutual benefits to society, animals and ecosystems.

Primordial prevention, including interventions that attempted to reduce risk factors through improvements to social and environmental conditions, was underrepresented, with about a third of the papers having any of these elements. Extracted One Health papers were more focused on distal (downstream) interventions that reduce exposure to risk factors, than upstream ones that prevent risk factors from arising. Upstream primordial approaches target social and environmental conditions at a societal level, before harmful risk factors come into play [26]. Focusing actions on upstream interventions, allows health practitioners to work further up etiologic pathways, intervening early and broadly, to deal with shared drivers of global harms like climate change, pandemics, rapid loss of biodiversity and others [27–30].

More than half of the papers had no evidence of health promotion or harm reduction attributes. In the 411 papers, the term 'health promotion' was only encountered 10 times, although only five of those papers used the terms as described in our introduction. Many papers mentioned the concept of reducing harm (as evidenced by papers with attributes clustering most around the concept that there was a persistant harm to minimize), however the use of the term 'harm reduction' as a population health practice was not detected. No papers had all attributes of health promotion and harm reduction. This was to be expected as attributes necessary to solve a problem will vary with the problem. Even in the high health promotion/harm reduction attribute categorized papers there appears to be room to encourage more focus on participatory community action. There was also opportunity to advance the concept of self-determination, described as individuals and communities having the capacity to choose their desired health options without judgement [18].

Implementing on the ground change in priority and high consequence health issues was a common theme in the strongest health promotion/harm reduction papers. Stakeholders in these program and service models were interested in methodologies to advance health through novel change. Action, versus understanding mechanisms of problems, was targeted. These interventions were most commonly performed with an array of diverse stakeholders, foregoing professional dominance and working as partners with the affected community to create the most sustainable changes. Communities in these papers were encouraged to act towards health decisions and actions and felt empowered to do so because they were valued and treated with dignity and respect. Stakeholders considered upstream social and ecological determinants of health in a whole systems approach. This is a particularly notable strength as socio-economic determinants have been favored over the ecological determinants in human population health strategies, raising concerns that human health approaches are muted and unfocused on ecological issues [31–33]. Much consideration was given to social, cultural and economic context and timing, encompassing a comprehensive settings-based approach. Buttigieg et al. report "Context and timing are key to determining how, when and why a One Health approach should be applied…at the right place, at the right time, with the right people and using the appropriate conditions/infrastructure" [34]. A recent paper by Hitziger et al. also emphasizes the importance of citizen participation and societal context regarding knowledge translation practices in One Health initiatives [35]. The success of outcomes collectively described in these papers was attributed to the inclusion of these vital components.

The rapid emergence of global threats like the COVID-19 pandemic

Table 2
Summary of charted data to characterize the scope of practice seen in abstracts from 439 self-declared One Health publications.

TOPIC	Section	No.	%
THEME	Food security	37	8.4
	Climate change	17	3.9
	Education	168	38.3
	Collaboration	132	30.1
	Disease prevention	294	67.0
	Funding	22	5.0
SPECIES	Livestock	95	21.6
	Primates	2	0.5
	Wild	62	14.1
	Public display	3	0.7
	Mammals	100	22.8
	Avian	26	5.9
	Aquatic	10	2.3
	Insects	15	3.4
	Arthropods	12	2.7
	Plants	5	1.1
	Reptiles	1	0.2
	Amphibians	1	0.2
	Domestic pets	33	7.5
STAKEHOLDERS	Local residents	80	18.2
	Tourism	3	0.7
	Government & Policymakers	119	27.1
	Agriculture	97	22.1
	Immigrants	4	0.9
	Academics	283	64.5
	Non-local consumers	4	0.9
HEALTH ISSUES	Zoonotic	243	55.4
	Anti-microbial resistance	41	9.3
	Food safety	38	8.7
	Genetics	10	2.3
	Human injury	2	0.5
GEOGRAPHY	Worldwide	218	49.7
	Europe	49	11.2
	N. America	37	8.4
	S. America	6	1.4
	Asia	36	8.2
	Africa	76	17.3
	Pacifica	16	3.6
	Arctic	5	1.1
	Caribbean	1	0.2
CHALLENGES and OUTCOMES	Economic	51	11.6
	Monitoring	80	18.2
	Stakeholder participation	66	15.0
	Animal migration	10	2.3
	Human immigration	5	1.1
	Implementation	105	23.9
	Academic knowledge	300	68.3
	Environmental pollution	18	4.1
	Law	13	3.0
	Collaboration	170	38.7

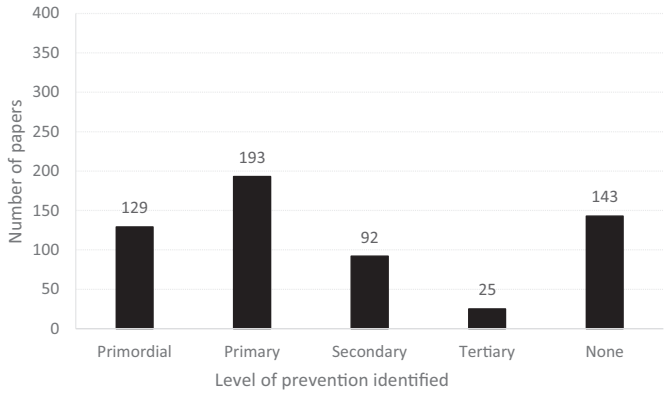

Fig. 3. Level of prevention(s) identified across 411 self-declared One Health publications.

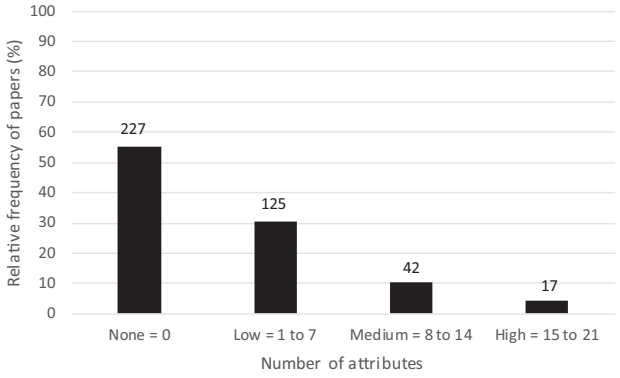

Fig. 4. Relative frequency of combined health promotion and harm reduction attributes in 411 self-declared One Health publications.

that have complex interconnections, dynamics and unexpected outcomes have added new pressure to One Health [36]. The worldwide expectation for One Health is to take a lead in facing these incredible harms, to meet and ultimately overcome these unprecedented challenges and uphold equitable and responsible planetary stewardship [37,38]. One Health needs to evolve to handle accelerating planetary complexity and answer the call to help create populations and ecosystems that are less vulnerable and more resilient against existent and surprise threats and harms [39]. Understanding the connectivity of system's parts and relationships, often separated by space and time, will foster knowledge of system vulnerability and elucidate ways and means to reduce exposures and/or increase capacity to adapt and deal with adversity plaguing societies [40,41]. This review shows that One Health can adopt health promotion and harm reduction concepts to deal with considerable imminent challenges. Greater adoption and customization of health promotion and harm reduction will likely strengthen One Health's focus and operationalization, and enable more comprehensive and preventive considerations and actions towards health and disease on a global scale.

Health promotion and harm reduction have been successful in protecting human health for decades and thus are strong models for the contemporary and future evolution of One Health. They work in tandem to support lay persons and professionals in addressing and actioning societal obstacles, however each is individually nuanced. A well known example of success with health promotion is the program Healthy Cities. Initiated by WHO in 1986, the program continues as of this writing, Healthy Cities champions community participation, partnership, empowerment and equity for optimal urban health and development. It uses a settings-based, whole system approach to create health-supportive environments which encourage a good quality of life for individuals and communities [42,43].

Since the 1970s and 1980s harm reduction has been a prominently recognized, compassionate and pragmatic approach for reducing harms associated with certain risky behavior choices and improving a person's quality of life [17,44]. Its concepts and programs have had a global reach and are endorsed and practiced by the WHO, the UN General Assembly [45] and many countries around the world in the management of the harms associated with drug, alcohol and tobacco addictions, risky sexual behaviors and homelessness. There is strong scientific evidence to support this approach as feasible, effective and economical [46]. What is highly notable is harm reduction experts posit that while harm reduction policies, programs and practices are well known and utilized in substance abuse harms, they lack a broader applicability to date, in other health risk behaviors, and from other allied health professionals [17,47].

4.1. Review limitations

Research in this review was performed in a systematic method. The authors acknowledge that we engaged as a multidisciplinary team and expect some subjective bias in our findings. Examination of papers that both reviewers disagreed on, did not reveal any systematic bias. We believe however, that multidisciplinary bias should be expected and embraced, as successful One Health outcomes rely on cross disciplinarity and full agreement may not always be possible. We also concede that in performing this scoping review, some literature surrounding human-environmental health may have been overlooked, as we focused entirely on self-declared One Health literature. This narrowed focus may have introduced some selection bias. Other examples similar to the ones presented likely exist in EcoHealth, global health, sustainability or similar fields of study.

5. Conclusion

For decades One Health has been working on pressing complex health problems that overlap societies and nature. Continual improvements have been made to this approach over time by contributors in many fields. We failed to find a significant amount of direct reference to health promotion and harm reduction concepts and found very few papers applying their principles and attributes. The rare examples that were found in the One Health literature appeared within the last eight years, further confirming the novel nature of this approach to protecting and improving global health.

Health promotion and harm reduction concepts and methodologies in public health provide a good model for approaching One Health problems. These approaches are systems-based and consider proximal social and ecological determinants of health in a specific place and time. Health promotion and harm reduction meet communities 'where they are' with a problem and works towards collective action in an inclusive and participatory way, and in doing so, promotes health empowerment and sustainability. Incorporating health promotion and harm reduction should strengthen the ability of One Health to contribute towards overcoming some major existing and emerging global health challenges.

For the list of scientific papers compiled for this manuscript, please contact the corresponding author, Christa A. Gallagher at cgallagher@rossvet.edu.kn

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Declaration of Competing Interest

The authors declare no conflicts of interest.

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