Journal of Health, Medicine and Nursing
ISSN 2422-8419 An International Peer-reviewed Journal
Vol.15, 2015

Policy Concerns, Opportunities, Challenges, and Attitude towards One Health Practice in Zambia

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Abstract
One Health in terms of collaboration, particularly between human and animal health sectors to prevent and control zoonoses has been low while the sectors have a lot of things in common. Such common things include aspects of disease causative agents (viruses, bacteria, parasites, etc.) and those of disease occurrence mediator conditions (social, cultural, economic or climatic). Therefore, the research from which this paper is based was done with the objectives to: (a) assess the extent to which human and animal health policies facilitate one health in terms of collaboration; (b) rank opportunities for and challenges to collaboration among medical, and veterinary officers according to the views and experiences of the respondents in the Ministry of Health and Ministry of Agriculture; and (c) determine the attitude of the respondents towards One Health approaches in terms of collaboration in dealing with zoonoses. A cross-sectional research design was used in this study whereby data were collected at a single point in time without repetition. Purposive sampling method was used to make sure that the respondents were only officials who usually participated in policy formulation in the two Ministries. It was found that almost three quarters (73.1%) of the respondents from both ministries agreed that there was no policy which directly facilitated One Health in terms of collaboration. It was also found that 83.6% of the respondents pointed out that human and animal health policy making process was a top-down process. Furthermore, it was found that the main opportunities that could enhance collaboration were sufficient money in budgeting; advocacy for control of neglected zoonotic diseases in human and animal health; and one health policy formulation (71.3%, 68.2% and 65.5% respectively). The overall attitude towards collaboration among respondents was favourable; they scored an average of 62.2 out of 100.0 points on a Likert scale. It is concluded that if opportunities enhancing collaboration were strengthened and challenges to collaboration were overcome, human health and animal health experts could collaborate more in reduction of disease burden in both humans and livestock.
Keywords: One health, policy, attitude, opportunities, challenges

Introduction

Zoonotic diseases have been lingering on despite efforts that have been made to control them, if not eradicating them. Therefore, One Health approaches have increasingly been being adopted in order to pool together medical, veterinary, and socio-economic types of expertise to exploit synergies that such collaboration can bring about. One Health is a comprehensive approach to health that focuses on improving health and well-being through the prevention of risks and the mitigation of effects of crises (e.g. emerging diseases) that originate at the interface between humans, animals and their various environments, and promoting multi (cross) sectoral collaborations and a “whole of society” treatment of health hazards, as a systemic change of perspective in the management of risk" (Stone, 2011). However, in most developing countries including Zambia, surveillance of zoonotic diseases is not done in collaboration between veterinary medicine and human medicine due to the fact that many developing countries lack diagnostic capacity, health infrastructures and financial resources (Zinsstag*et al*., 2007). Therefore, the aim of the research on which this paper is based was to assess the extent to which the current Zambian human and livestock health policies facilitate One Health practice and explore the challenges and opportunities for collaboration in preventing and controlling zoonotic diseases.

General Information on One Health Collaborative Efforts between Human and Animal Health Personnel

Collaboration between human and animal health has been low despite having a lot of things in common, including aspects of disease causative agents (viruses, bacteria, parasites, etc.) and those of disease occurrence mediator conditions (social, cultural, economic, climatic, etc.). If opportunities enhancing collaboration among human and animal health are not strengthened and the challenges which impede such collaboration are not overcome, zoonotic diseases are likely to go on inflicting heavily on humans and livestock. This will keep the burden of disease high thereby limiting chances of socio-economic development. Zoonotic diseases are caused by many different pathogenic agents. In most cases, humans are accidental or “spill-over” hosts of a disease-ecological cycle maintained by animal hosts, including insects (Kayali *et al*., 2003; Schelling *et al*., 2003).

Because of the circulation of zoonotic agents between animals, humans, and the environment, the cost of a disease affects human activity and health in addition to other economic sectors. According to the Institute of Medicine (2009), zoonotic pathogens cause more than 65% of emerging infectious diseases. The direct cost of zoonotic diseases in the 2000s was estimated to be more than $20 billion with over $200 billion indirect losses to affected economies as a whole (World Bank, 2010). In the last 60 years, many industrialized countries have successfully controlled or eliminated zoonotic diseases through costly public investment facilitating coordinated interventions, including "test and slaughter," feed bans, mass vaccination of domestic animals and wildlife, health education and milk pasteurization (Zinsstag *et al*., 2005). These are highly effective methods of eliminating zoonotic diseases which require important operational, legal, and financial collaterals (Keusch *et al*.,2009).

One Health can be associated with Rudolf Ludwig Karl Virchow (1821 - 1902) who argued that "between animal and human medicine there is no dividing line–nor should there be". Historically, it started in the mid-1700s when Edward Jenner (1749 - 1823) contributed innovatively to immunisation and the ultimate eradication of smallpox using cowpox to confer specific immunity to smallpox (Riedel, 2005). Another person who has contributed prominently to One Health is Calvin W. Schwabe (1927–2006) who, in the 1960s, coined the term 'One Medicine' (Schwabe, 1969), now commonly called 'One Health', and proposed a unified human and veterinary approach to zoonotic diseases. A "One Health" approach demonstrates closer cooperation between human and animal health resulting in benefits that cannot be achieved through the two medicines working independently. It is suggested that such an approach has enormous potential to improve public and animal health and provide cost savings in the public and private sectors. Sampling humans and animals simultaneously in an integrated study design decreases detection time for zoonotic diseases (Schelling *et al*. 2003; Zinsstag *et al*., 2009).

Despite the pioneering work of the above scholars, One Health practice is not well addressed in Developing countries. Some of the reasons for that are historical, with human medicine having started much earlier than veterinary medicine (Zinsstag *et al*., 2012). For example, according to Anonymous (2014), Human medicine was established in the early 1100s in Britain and France. However, according to Zinsstag *et al*. (2012), veterinary medicine remained in the hands of equerries (the persons in charge of the horses for warfare) until Claude Bourgelat founded the first veterinary school in Lyon (France) in 1761. Zinsstag *et al.* (2012) further narrate that the end of the 19th century with the advent of cellular pathology and microbiology was a period of very close interaction of human and animal health as comparative medicine, but that in the 20th century veterinary and human medicine evolved in a way as to specialise into more and more sub-disciplines, and the influence of comparative medicine decreased.

Sources of Data for this Paper

The source of data for this paper was a research which was conducted in November 2014 in Lusaka where the headquarters for the Zambian Ministry of Health and Ministry of Agriculture are found. The total number of the respondents was 67. A cross-sectional research design was used to collect data at a single point in time without repetition. Purposive sampling method was used to select the respondents, making sure that they were only officials who usually participated in policy formulation process in the two ministries. There were also 2 key informant interviewees; one was the Director of Public Health/Policy and Research at the Ministry of Health and the other one was the Director of Veterinary Health at the Ministry of Agriculture.

A self-administered questionnaire was used to collect primary data from the respondents. Also, interview guides for discussion with key informants were used. Secondary information in the form of literature review was collected from books, reports and journals to supplement primary data. Data from key informants were recorded in a notebook and analysed by comparing and contrasting information given by various interviewees. Fourteen statements of opportunities for and another fourteen statements of challenges against between medical and veterinary officers in dealing with zoonotic diseases were compiled to determine extents to which each of them held by using pair-wise ranking. The ranking was done by mentioning two factors at a time and asking the respondents which of them was a more important opportunity or a more serious challenge, according to their views. The procedure was done repeatedly until every opportunity was compared with all the other opportunities and every challenge was compared with all other challenges. By that way, every one of the opportunities and challenges could be mentioned by every respondent at most 13 times, the range being 0 to 13. The average number of times out of 13 that every opportunity or challenge was mentioned, expressed as a percentage over 13, was the extent to which the opportunities and challenges were important or serious.

Other issues studied were whether the respondents would support One Health practice, if it were institutionalised, and attitude towards One Health practice. In order to determine attitude, the questionnaire incorporated a 100-point Likert scale, which comprised 20 statements, 10 of which had positive connotations while the other 10 had negative connotations. One would score a minimum of 20 points, if one replied strongly disagree (1 point) to all the statements, and one would score a maximum of 100 points if one replied strongly

agree (5 points) to all the statements. The other alternative answers were disagree (2 points), undecided (3 points) and agree (4 points). However, during data analysis, three options were used by collapsing strongly disagree and disagree into disagree, leaving undecided intact and collapsing agree and strongly agree into agree. Overall, 20 to less than 60 points scored denoted unfavourable attitude, 60 points scored denoted neutral attitude and more than 60 points scored denoted favourable attitude. SPSS software programme was used to sum up and categorise the points scored on the Likert scale and analyse other quantitative data. The analyses included computation of descriptive statistics, particularly frequencies, percentages, averages, and minimum and maximum values. Moreover, the points scored on the Likert scale were compared using independent samples t-test to determine whether they were significantly different between the respondents from Ministry of Health and those from the Ministry of Agriculture. Furthermore, the points scored on the Likert scale were compared using one-way ANOVA to determine whether they were significantly different due to their levels of education and positions they held.

4. Empirical Findings from the Research

4.1 *Socio-Demographic Characteristics of the Respondents*

Age, education and position held at work are the characteristics that were asked about. The ages of the respondents ranged from 30 to 59 years, with an average of 38.1 years (95% CI: 36.5 to 39.7years). Slightly more than three-fifths (61.2%) of all the respondents held first degrees; 19.4% held Diplomas and 16.4% had Masters Degrees. Only two respondents held PhDs (3.0%). Among the Ministry of Health and the Ministry of Agriculture staff, the greatest proportion of the respondents' professions was that of Veterinary Doctors (32.8%), followed by that of Medical Doctors (25.4%), Medical Clinicians (17.9%), animal production staff (11.9%), and animal science staff (9.0%). The respondents had held the positions for 4 to 16 years, with an average of 9.3 years. About one-fifth (17.9%) of the respondents had held their positions for more than 7 years, while the rest (82.1%) had held their positions for at least 4 years. The years the respondents had held their positions imply that they were experienced enough to provide realistic information that was relevant to the research.

4.2 *Extent to which Human and Animal Health Policies Facilitate One Health Practice*

The respondents were asked whether there were policies or guidelines which were in place to facilitate One Health practice, and if the policy making process considered stakeholders in the first place. It was found that 73.1% of the respondents from both ministries agreed that there were no policies which directly facilitated One Health practice. However, the key informant interviewee at the Ministry of Health had positive comments on the possibility of having a policy for collaboration in the future; he said: *"Policy for collaboration in disease detecting and control between us and animal health people is still trying to be streamlined. Contingency plans exist for high profile diseases such as the recent outbreak of Ebola; it helped all of us to work together to make sure that the disease didn't get into the country by any possible risk factor. However, no official policies exist for collaboration and control of zoonotic disease''* (Key informant interviewee, Ministry of Health).

Musing over the views of the key informant on the possibility of formulating a One Health policy, it looks like it is possible to move towards that attainment. However, the ideas of other people in the Government system were not known, although the words are encouraging.

4.3 *Ranking Opportunities for and Challenges to One Health Practice*

The extent to which each of the opportunities and challenges was a more important opportunity or a more serious challenge was determined by using pair-wise ranking as explained in the methodology section of this paper. Also, the respondents from both ministries were asked whether there were policies or guidelines which facilitated One Health, and if the policy making process involved stakeholders.

4.3.1 Respondents' responses on the extents to which opportunities for collaboration hold

Using the procedure described in the methodology section of this paper, the 67 respondents interviewed responded to all the 14 opportunities that were evaluated in the research. It was found that the most important opportunities for collaboration were sufficient money in budget (s) (71.3%), advocacy for control of neglected zoonotic diseases (68.2%) and One Health policy formulation guiding applied research in health (65.5%). The extents to which the other opportunities held are as seen in Table 1. The two most important opportunities in Table 1 (Sufficient money in budget (s); and advocacy for control of neglected zoonotic diseases) were also reported by Zinsstag *et al.* (2007) whereby they pointed out that poor surveillance programmes, limited institutional capacity and without donor assistance developing countries cannot successfully invest in zoonoses control. Moreover, Kayunze *et al.* (2014) showed these two factors as some of the most important opportunities towards collaboration in Ngorongoro and Kibaha Districts, Tanzania. Therefore, these two factors are also very important determinants of collaboration among medical and veterinary officers in detecting and controlling zoonotic diseases in a holistic way in Zambia.

Table 1: Extents to which opportunities enhance collaboration between medical and veterinary officers

Factors enhancing collaboration	n	Scores out of 13			Extents to which the factors are important (%)
		Min.	Max.	Mean	
Networking in research and disease control activities	67	1	10	4.22	32.5
Community-based prevention and control of zoonoses	67	1	10	5.10	39.2
Having early warning systems for detection and control and control of zoonoses diseases	67	0	8	3.96	30.5
Collaboration through professional associations	67	3	11	6.85	52.7
Sufficient money in budget (s)	67	4	13	9.27	71.3
One health approach to health financing	67	3	11	5.82	44.8
Common training in zoonotic diseases for both veterinary and medical doctors, and fieldworkers	67	3	9	5.99	46.1
Appropriate veterinary public health	67	2	9	5.87	45.2
Dual benefit: gains for animal and human health	67	0	8	4.24	32.6
Demand-driven, problem-led research	67	3	12	6.27	48.2
One health policy formulation guiding applied research in health	67	5	12	8.52	65.5
Advocacy for control of neglected zoonotic diseases	67	4	12	8.87	68.2
Planning to choose in the context of one health	67	3	11	7.10	54.6
Adequate transport facilities for medical, veterinary and wildlife officers	67	4	11	7.94	61.1

4.2.2 Respondents' responses on the extents to which challenges to collaboration hold

Using the procedure described in the methodology section of this paper, the 67 respondents interviewed responded to all the 14 factors of challenges to collaboration. It was found that the most serious challenges to collaboration between medical and veterinary officers were lack of resources (81.5%), inadequate transport facilities for medical and veterinary officers (66.9%) and inadequate resources for dissemination of results and raising public awareness(63.4%). These results imply that resources are key factors to enhance collaboration between these two fields to work together in detecting and controlling zoonotic diseases, and the opposite is also true. Also, not researching together and dissemination of results between medical and veterinary health officers is a very serious challenge, which impedes effective collaboration among medical and veterinary experts. Researching on the commonest zoonotic diseases which affect both humans and animals seems to be a very effective way of detecting and controlling zoonotic diseases to both humans and animals in a holistic approach. However, lack of adequate resources put such reality in jeopardy. The extents to which the other challenges held are as seen in Table 2.

Table 2: Extents to which various challenges impedecollaboration between medical and veterinary officers

Factors impede collaboration	n	Scores out of 13			Extents to which the factors are important (%)
		Min.	Max.	Mean	
Institutional separation (e.g. between ministry of health, and agriculture and wildlife authorities)	67	1	11	3.75	28.8
Bureaucracy in making decisions regarding human and animal health issues	67	2	9	5.34	41.1
Control of zoonotic diseases being based under only one authority	67	0	10	2.06	15.8
Lack of clarity about roles of the public and private sector partners	67	1	8	4.67	35.9
Lack of resources	67	3	13	10.60	81.5
Budgetary separation: veterinary and medical costs not pooled	67	2	8	5.36	41.2
Low emphasis on zoonotic diseases to human health personnel during training	67	3	10	6.21	47.8
Weak veterinary/human public health infrastructure	67	3	11	7.18	55.2
Difference of emphasis: medics focus on individual patients, vets on populations	67	2	10	6.18	47.5
Research being not demand-driven but donor-led	67	3	11	7.63	58.7
Applied research is not recognized or rewarded as being important as basic research	67	3	10	5.79	44.5
Inadequate resources for dissemination of results and raising public awareness	67	3	12	8.24	63.4
Lack of consensus on priority-setting	67	3	11	6.90	53.1
Inadequate transport facilities for medicaland veterinary officers	67	3	13	8.70	66.9

4.4 *Attitude of the Respondents towards One Health Practice*

Attitude of the respondents towards One Health practice was determined in two ways. One of the ways was by asking the respondents whether they would not support, would just support or would support to a large extent the practice of One Health if it were institutionalised. Almost all the respondents (98.5%) said that they would support it to a large extent and 1.5% said that they would just support it. No one said he/she would not support it. Both the key informants who were interviewed during the research also said that they would support the institutionalisation of One Health. These results mean that the respondents would be willing to support institutionalisation of One Health practice. The other way of determining attitude towards One Health practice, and actually the main one in this research, was by using a Likert scale, which comprised twenty (20) statements, ten of which had positive connotations while the other ten had negative connotation, as described in the methodology section of this paper. The results showed that the average score by all the respondents on the 20 statements was 62.2 over 100; while the minimum point scored was 55 (3.0%)and the maximum point scored was 72 (1.5%). Since 60 denoted a neither negative nor positive attitude and the respondents scored higher than that, the respondents had an overall favourable attitude towards the practice of One Health concepts.

The scores by all the respondents on all the statements are presented in Table 3. In the table, it is worth noting that Statement Numbers 1 to 10 had positive connotations while the rest of the statements, Numbers 11 to 20, had negative connotations. All the respondents were of the view that the collaboration would help more relieve people of zoonoses and the collaboration among medicals and veterinary officers would greatly facilitate detecting and dealing with zooneses. Almost all of the respondents also agreed with the statements that "Medical and veterinary officers monitoring infectious diseases collaboratively would enhance early detection of diseases" (98.5%), while 97.0% agreed with the statement that "Medical and veterinary officers having more positive attitude towards one another's field of specialization could greatly enhance collaboration among them", and 86.5% of the respondents agreed with the statement that "Collaboration among medical and veterinary officers should start by they being trained on some common aspects e.g. neglected zooneses". The finding that so many respondents agreed with those statements implies that they had favourable attitudes towards collaboration.

The respondents also had reasonable responses to the statements that had negative connotations. For example,

some of them responded negatively to the statements that "Medical and veterinary officers cannot research together on zooneses because of lack institutional framework for their collaboration" (25.0%); "Medical and veterinary officers cannot diagnose and survey on zooneses together because of lack of an institutional framework for their collaboration" (23.9%), and "Incidences of diseases cannot just decrease due to medical and veterinary officers monitoring infectious diseases collaboratively" (22.4%). The other proportions of the respondents who disagreed were neutral or agreed with the statements of the Likert scale used are as seen Table 3.

Table 3: Respondents' scores on the items of the Likert-scale (N= 67)

Attitudinal statement	**Disagree (%)**	**Undecided (%)**	**Agree (%)**
1. The collaboration among medicals, veterinary and wildlife officers would greatly facilitate detecting and dealing with zooneses	0.0	0.0	100.0
2.The collaboration would help more relieve people of zoonones	0.0	0.0	100.0
3. The collaboration would ensure better access to health inputs by poor people and their livestock	0.0	22.7	77.3
4. Medical and veterinary officers can diagnose and do survey on zoonoses together by using effective surveillance systems	1.5	22.4	76.1
5. Medical and veterinary officers can research together on zoonoses with linkage to local public health systems	1.5	25.4	73.2
6. Medical and veterinary officers can change from single disease approach control measures to more integrated health promotion	23.9	3.0	73.1
7.Medical and veterinary officers sharing data about diseases could be one of good ways of collaboration	22.4	0.0	77.6
8. Medical and veterinary officers monitoring infectious diseases collaboratively would enhance early detection of diseases	1.5	0.0	98.5
9. Collaboration among medical and veterinary officers should start by they being trained on some common aspects e.g. neglected zooneses	6.0	7.5	86.5
10. Medical and veterinary officers having more positive attitude towards one another's field of specialisation can greatly enhance collaboration among them	0.0	3.0	97.0
11. Collaboration medical and veterinary officers would add nothing to detection and dealing with zooneses	91.0	7.5	1.5
12. Collaboration would hardly relieve people of zooneses	92.5	6.0	1.5
13. Collaboration would benefit better-off people who can pay for medical and veterinary services	97.0	3.0	0.0
14. Medical and veterinary officers cannot diagnose and survey on zooneses together because of lack of an institutional framework for their collaboration	76.1	0.0	23.9
15. Medical and veterinary officers cannot research together on zooneses because of lack institutional framework for their collaboration	75.0	0.0	25.0
16. Medical and veterinary officers cannot research together on zooneses because of lack institutional framework for their collaboration	75.0	0.0	25.0
17. Changing from single diseases approaches control measures to more integrated health promotion is impossible because of scepticism between medical and veterinary officers	74.6	4.5	20.9
18. Medical data are too confidential for sharing with veterinary officers	89.6	10.4	0.0
19. Incidences of diseases cannot just decrease due to medical and veterinary officers monitoring infectious diseases collaboratively	70.1	7.5	22.4
20. There is no way medical and veterinary officers can be trained on common aspects of diseases	92.5	7.5	0.0

Besides descriptive analysis of the attitudinal statements, the overall points scored on the statements were compared across the two Ministries using Independent samples t-test to find whether respondents from the Ministry of Health and Ministry of Agriculturehad significantly different attitude towards One Health. The comparison results are presented in Table 4 and show that there was a statistically significant difference between the mean points scored by the respondents from the Ministry of Health and the Ministry of Agriculture($t = 3.564$, $p = 0.001$).

Table 4: Independent Sample t-test comparison of points scored on the Likert scale

Attitude	Ministry	n	Mean points scored on attitude	Std. Deviation	t	df	Sig (2-tailed)
Attitude towards One Health	Ministry of Health	28	64.00	2.762	3.564	65	0.001
	Ministryof Agriculture	39	60.87	4.008			
Total		**67**	**62.1**	**-**	**-**	**-**	**-**

The findings in Table 4 show that the respondents from the Ministry of Health had a significantly higher mean score on attitude towards One Health (64.0) than those from the Ministry of Agriculture(60.8).This findings also imply that respondents from the Ministry of Health had more positive attitude towards One Health practice.

The overall points scored on the statements of the Likert scale were also compared across the education levels of respondents in the two ministries where data were collected using One-Way ANOVA to find whether respondents with different levels of education had significantly different attitudes towards One Health practice. The comparison results are presented in Table 5 and show that the points scored on the Likert scale used did not differ significantly among the respondents with different levels of educations. This means that all of them had almost the same attitude towards the practice of One Health. This finding is good because it implies that if such practices were institutionalised, levels of education would not be a barrier; staff with different levels of education in the Ministry of Health and the Ministry of Agriculture would collaborate to implement them. However, since 30% of the respondents had negative attitude towards such practices, we should not be complacent with the results on the attitude scale; we should strive to bring on board other stakeholders who might be having negative attitude towards the practice of One Health.

Table 5: One-Way ANOVA comparison of points scored on the Likert scale

Levels of Education*	n	Mean points scored	Between and within groups	Sum of squares	df	Mean square	F	Sig.
Diploma	13	61.0	Between Groups	36.772	3	12.257	0.822	0.486
First Degree	41	62.2	Within Groups	939.079	63	14.906	-	-
Master's Degree	11	62.5	-	-	-	-	-	-
PhD	2	65.5	-	-	-	-	-	-
Total	**67**	**62.1**	**-**	**975.851**	**66**	**-**	**-**	**-**

PhD = Doctor of Philosophy

5. Conclusion and Recommendations

Based on the findings from this paper that 73.1% of the respondents agreed that there was no policy which directly facilitated collaboration between medical and veterinary personnel, it is concluded that it will be very difficult for health sectors in Zambia to adopt One Health practice in detecting and controlling of zoonotic diseases, is a relevant policy is not in place. In view of this conclusion, it is recommended that responsible authorities should work together to come up with a policy framework for collaboration between medical and veterinary personnel (One Health) in dealing with zoonotic diseases.

Also, based on the findings that the opportunities for and challenges to collaboration between medical and veterinary experts which were listed during in the research hold true; the most important opportunities for collaboration being sufficient money in budget (s), advocacy for control of neglected zoonotic diseases and One Health policy formulation guiding applied research in health; it is concluded that sufficient budgeting is a key factor in collaboration especially in disease detection and control. Based on this conclusion, it is recommended that health budget should be number one government priority.

Based on the findings from this paper that the most serious challenges to collaboration were lack of resources, inadequate transport facilities for medical and veterinary officer sand inadequate resources for dissemination of results and raising public awareness, it is concluded that the main opportunities that can enhance collaboration are availability of funds for collaborative work, presence of zoonotic diseases which necessitated human and animal health researchers and trainers to pool their expertise together, and instruction from upper levels. On the basis of this conclusion, it is recommended that the Government should mobilize enough resources in order to facilitate such collaboration.

The fact that other challenges that impeded collaboration were lack of communication among potential collaborators, lack of network for collaboration, and potential collaborators having quite different fields of specialisation, it is concluded that institutional framework which can facilitate the flow of information between ministries/departments is very crucial for effective collaboration between medical and veterinary personnel. In order to increase the practice of One Health, various stakeholders are urged to keep up the factors enhancing

collaboration and control the ones that impede collaboration. In view of the conclusion that institutional framework is very crucial for effective collaboration, it is recommended that the Government should make sure that there is a specific department which coordinates collaboration at the ministerial levels.

The findings showed that there was significant difference in attitudes towards One Health practice ($t = 36$, $p = 0.001$) between staff from the Ministry of Health who scored 64.00 over 100.00 and those from the Ministry of Agriculture who scored 60.87 over 100.00 on a Likert scale that was used to gauge their attitude towards On Health practice while more than 60.00 points meant positive attitude towards One Health practice. On the basis of these findings, it is concluded that, although the staff from both ministries had positive attitude towards One Health practice, the staff in the Ministry of Health have more positive attitude towards One Health practice and thus they can cooperate more with experts from other ministries. Based on this conclusion, it is recommended that the Ministry of Health should strengthen the committee which coordinates collaboration between human health and animal health.

Based on the findings that the average points scored on the Likert-scale were62.1 (95% CI: 61.2 to 63.1), it is concluded that the overall attitude towards One Health practices is positive and medical and veterinary staff would support it if it was institutionalised. In view of this conclusion, it is recommended that the appropriate time for implementing One Health practice is now since there area lot of animal diseases which threaten human interactions such as Ebola viruses. However, since 30%of respondents had unfavourable attitude towards such practices, we should not be complacent with the results on the attitudinal scale; we should strive to bring on board other stakeholders who might be having unfavourable attitude towards the practice of One Health.

Also, as it was revealed by the key informant interviewee that human health and animal researchers collaborated during the 2014 Ebola outbreak whereby some suspected Ebola samples from University Teaching Hospital (UTH) were transferred to University of Zambia Veterinary laboratory for diagnosis; and an Ebola task force was formed which included Medical and Veterinary health experts to work together in order to control Ebola, it is concluded that such collaboration was substantial, but not enough. On the basis of this conclusion, it is recommended that human and animal health experts dealing with zoonotic diseases should have more collaborative activities, especially on research and seek necessary support from the Government and other stakeholders to facilitate their operations for the benefit of the public.

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