

Health Literacy and its Associates in the Context of One Health Approach: A Research Agenda Towards an Industrial Economy in Tanzania

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Abstract

Transformation of agriculture and natural resources for sustainable development towards industrial economy in Tanzania, inter alia, relies on the quality of population. Health has always remained a very essential determinant of quality of a population. Evidently, attaining optimal health calls for collaboration between humans, animals and environmental health professionals plus understanding consequences of humans, animals and environment interactions on health. Attaining good health faces numerous challenges, health literacy (HL) inclusive. Despite, HL being a predictor of health outcomes, health care costs and utilization, yet, it is not empirically known to which extent most countries, Tanzania inclusive, have made efforts in terms of research and interventions in this important variable. A cross sectional study was conducted in Morogoro urban and Mvomero districts in Morogoro, Tanzania to specifically (i) assess HL, (ii) determine factors associated with HL, (iii) identify research efforts and interventions on HL in Tanzania. . Data were collected through a structured questionnaire from 1440 respondents obtained using multistage sampling procedure. HL was measured using One Health Literacy Assessment tool. Quantitative data were analysed using IBM-SPSS (v20) and Gretl software. The results revealed that 36.3% of the respondents had inadequate HL, 30.8% with Marginal HL and Adequate HL standing at 32.9%. Pearson coefficient correlation revealed HL correlating to group of attitudes ($r = 0.135$, $p = 0.01$), levels of engagement in health-related discussion ($r = 0.609$, $p < 0.05$), health behaviour categories ($r = -0.648$, $p = 0.05$) and category of information seeking ($r = 0.753$, $p = 0.05$). Scanty empirical evidence exists on having HL researched and documented adequately in Tanzania. Having observed low HL and scanty research efforts and interventions on HL, efforts should be strengthened to promote HL under One Health Approach, given its importance towards realization of optimal health for humans, animals and the environment.

Keywords: Health literacy, Correlates, One Health Approach, One Health Literacy Assessment, Tanzania

1 Introduction

Unquestionably, good health is a cornerstone of development in all societies (URT, 2003a; URT, 2003b; IMF, 2004; URT, 2007a; WHO, 2012a; 2012b; Levin-Zamir *et al.*, 2017). Undeniably, health status of a society has profound effects on the rest of the sectors in a particular society (i.e. politics, social and the economic aspects) (Sayah and Williams, 2012; Edwards *et al.*, 2012; Sørensen *et al.*, 2015). On the contrary, other sectors in the society (the society, politics and the economy) have also considerable impacts on health status in a given society (Edwards *et al.*, 2012; Sayah and Williams, 2012). It is well known that good health determines quality of a population. Obviously, quality population is a crucial parameter for economic development (URT, 2003b; URT, 2007a; Lutz, 2014). In the presence of healthy population (high quality population) in the



society there are chances for the economy to perform very well. It is evident that good health boosts labour productivity, educational achievement and income, hence lessens poverty (Udoh and Ajala, 2001; Bloom, *et al.*, 2004). Ill-health and diseases have always been barriers to economic growth and subsequently to national development worldwide (Bloom *et al.*, 2001; Strittmatter and Sunde; 2011; WHO *et al.*, 2013). It is therefore apparent, that attaining development goal calls for improving health status of a nation's population. Nevertheless, numerous challenges exist towards attainment of good health (Byrne, 2004; Mamdani and Bangser, 2004; Kaseje, 2006; Sanders and Chopra, 2006).

In this context, it is obvious that transformation of agriculture and natural resources for sustainable development towards attainment of an industrial economy in Tanzania, *inter alia*, relies on the quality of population, which is determined by good health. There are numerous challenges existing towards attainment of good health (Muhanga and Malungo, 2018). This then makes it mandatory for government and other development partners to significantly promote health research and other related interventions which will result into promotion of good health, consequently high quality population.

Health Literacy (HL) is recognized as one of the prominent challenges towards attaining good health (Paasche-Orlow and Wolf, 2007; Muhanga and Malungo, 2017a). Substantial evidence exists (DeWalt *et al.*, 2004) on how HL stands as an important predictor of health outcomes and health care utilization, how HL affects a person's ability to access and use health care, to interact with providers, and to care for himself or herself (Paasche-Orlow and Wolf, 2007). It is also well documented (Gazmararian *et al.*, 2003; Nielsen-Bohlman *et al.*, 2004; Weiss *et al.*, 2005) on how limited HL impacts on health, health outcomes, health care costs and health care utilization. These impacts also include the likelihood of poorer comprehension of medical information, low understanding and use of preventive services, poorer overall health status, and earlier death (Nichols-English, 2000; Nielsen-Bohlman *et al.*, 2004).

It is obvious then that, with low HL, the likelihood of maintaining good health is minimized and quality of population impacted negatively. It is also important to note that, much as there is a need for the government and other development partners in Tanzania to significantly promote health literacy research and other related interventions to promote good health consequently high quality population, definitely for these efforts to realize their targets the need for regarding health as one remains imperative.

Evidence exists on how other government's efforts which aimed at improving health services and educating people to become more health literate *i.e.* to cultivate the knowledge and skills needed to access, understand and use health information, thus enabling and encouraging them to make healthier lifestyle choices (so as to achieve positive health outcomes for both humans and animals) (URT, 2003a) could not attain their intended objectives. Notably, despite these efforts, there has been prominent existence of health impairing behaviours (URT, 2007a:11-12; URT, 2007b: 34) which sometimes resulted into a higher prevalence of infectious diseases (including zoonotic ones *i.e.* tuberculosis, rabies, *Taenia solium* infestation, human brucellosis etc.) (see for



example Cleaveland *et al.*, 2002; Minja, 2002), and varying preferences for Tanzanians in terms of seeking healthcare services ranging from traditional healers, self-treatment, and no treatment instead of going to hospital (McCombie, 2002; URT, 2003b). These initiatives failure could be attributed to numerous factors. In light of what is reported, these initiatives did not take into account that attainment of optimal health for humans, animals and the environment calls for collaboration between humans, animals and environmental health professionals plus understanding consequences of humans, animals and environment interactions on health. Incognisant of that, the government of Tanzania initiated One Health Strategic Plan (2015 – 2020) which recognises the fact that attainment of optimal health for humans, animals and the environment requires collaborative efforts of humans, animals and environmental health professionals and at the same time a higher level of understanding maintained on the consequences of the interactions of humans, animals and environment on health (URT-PMO, 2015). However, how far this plan has realized its target at the local communities' level is not known. Based on that observation, it is also worth noting that, for initiatives to promote good health hence attain their intended goals, such initiatives should take into account the fact that there is an inextricable link between humans, animals and environmental health. Literature (Mbugi, 2012; CDC, 2018; Muhanga and Malungo, 2018a; 2018b) exemplifies this inextricable link very well.

While it is well documented on the influence of HL on health outcomes (Nichols-English, 2000; Nielsen-Bohlman *et al.*, 2004) and how good health impacts on quality population (URT, 2003b; URT, 2007a; Lutz, 2014) which is a crucial parameter for economic development, it is not empirically known whether there is substantial research and interventions documented on HL focusing on OHEA in Tanzania. Having noted the previous efforts by the government of Tanzania at improving health services and educating people to become more health literate i.e. to cultivate the knowledge and skills needed to access, understand and use health information, thus enabling and encouraging them to make healthier lifestyle choices; very little is known on the influence of these efforts on HL in the context of One Health Approach. Obviously, understanding associates/correlates of HL in the context of One Health Approach will contribute towards effectiveness and efficiency of interventions meant to promote HL.

It is against this background that the study on which this paper is based investigated the status and extent to which HL in the context of One Health Approach has been researched and documented in Tanzania, incognisant of the fact that this is a very crucial research agenda towards an industrial economy in Tanzania. Further, the study reviewed studies and interventions globally on measurements/assessment of HL. Additionally, in this study, a context specific OHA based HL measurement tool was developed which was used to assess HL under OHA. Also, correlates/associates of HL were established in this study from selected wards in Morogoro, Tanzania.

2 Materials and Methods

The study was conducted in Morogoro municipality and Mvomero districts, both found in Morogoro region in Tanzania. In 2012, Morogoro region had a population of (2.22 million) people distributed in six (6) districts with 506,289 households, the average



household size being 4.4 people (URT-NBS., 2013). The National One Health Strategic Plan 2015 - 2020 locates Morogoro under potential routes of risks exposure due to identification of some incidences of zoonotic diseases in the area (URT-PMO, 2015:16). Studies (Karimuribo *et al.*, 2005; Mgone *et al.*, 2014) have also identified health risks presence in the area.

A cross-sectional research design was applied in this survey research. A structured questionnaire guide using a Computer Assisted Personal Interviewing (CAPI) electronic platform was used for data collection. Multi-stage sampling procedures were used in selecting study units, involving four (4) stages (in choosing districts, wards, villages/streets and HHs). Identification of the districts, wards and villages/streets for the study was made through purposive sampling, whereas respondents from the study areas were selected using simple random sampling.

The inclusion criteria for the wards in Mvomero district were those wards where pastoralists were mostly residing, and households keeping animals and selling livestock products to Morogoro urban. The wards which were included in the study in Morogoro urban were those in areas where products from Mvomero district were sold, particularly where meat (mostly offals; utumbo in Kiswahili) and milk from Mvomero district were sold⁴. Four wards were purposely selected to participate in the study, two from each district after meeting the criteria. The selected wards were Doma and Melela in Mvomero district also Mazimbu and Kihonda Maghorofani in Morogoro municipality. Thereafter, two villages/streets were selected from the four wards, making a total of eight villages/streets. The reconnaissance visits identified these vendors mostly at Reli and Mazimbu Darajani streets in Mazimbu ward also at Msamvu B and Maghorofani in Kihonda Maghorofani ward.

For sample size estimation, a 95% confidence interval (CI), a margin of error of 5% and a design effect of 1.5 were assumed. A minimum adequate sample size was calculated based on the statistical estimation method of Kelsey *et al.* (1996). A sample size of 1440 respondents was

determined by using the formulae:

$$s = X^2 NP (1 - P) \div d^2 (N - 1) + X^2 P(1 - P).$$

Where:

s = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy, expressed as a proportion (0.05).

The sample size for this study was calculated from the total population of each 2 purposive selected streets/villages from a ward. After obtaining the sub-sample for

⁴These traders are popular in the area as *Wang'ombe* and *Baba Yeyo*.



each ward, proportions of each streets/villages from the total sample were calculated. The sample size was then distributed in the identified study streets/villages. Local leaders were involved in preparing the sampling frame.

After reviewing current knowledge on HL assessment tools and approaches, a context specific HL assessment tool and approach to assess HL in Tanzania under OHA was developed. This was done through modifying HLS-EU Q47 approach to suit the context of OHA in Tanzania, to assess HL in the interface of humans, animals and the environment in the selected wards in Morogoro Municipality and Mvomero in Morogoro Region in Tanzania. The HLS-EU approach confined itself to measure HL, mainly on 47 human health aspects. In order to fit in the context of OHA, 47 animals and 47 environmental health (47) aspects were included the developed HL assessment tool in the study conducted in Morogoro-Tanzania. A total of 141 health related aspects were included in the tool.

A questionnaire was developed reflecting health and related issues under the interface of humans, animals and the environment. This tool involved activities reflecting a number of aspects which have influence towards realizing optimal health for humans, animals and the environment. The developed tool comprises of a 4- point self-report scale (very easy, easy, difficult, and very difficult) to measure the perceived difficulty of selected One Health relevant tasks in the selected research sites in Morogoro, Tanzania. Data obtained unveiled the realities with respect to HL of the people under OHA through respondents' self-reporting (perceived) HL. Developed scale was tested for its reliability. Internal consistency of a scale according to Pallant (2007), among other, is a very important reliability aspect to the scale. Cronbach's alpha coefficient is a most commonly used indicator of internal consistency. According to DeVellis (2003) the Cronbach's alpha coefficient of a scale should be above 0.7. In this study, the Cronbach's alpha coefficient was 0.975, the value indicates a very good internal consistency reliability for the scale with the sample for the study.

HL was measured by asking respondents "On a scale from very easy to very difficult, how easy would you say it is to: i.e (find information about symptoms of illnesses that concern you)". The items which were asked in these questions mainly reflected three(3) health relevant areas (health care, disease prevention, health promotion) and four (4) information processing stages (accessing, understanding, appraising, application) related to health relevant decision-making and tasks on health and other associated aspects under the interface of humans, animals and the environment. An index of score was constructed to measure HL by assigning four (4) points to "very easy" response, three (3) points to "easy" response, two (2) points to "difficult" response, and one (1) point to "very difficult" response.

Using IBM-SPSS (v20) HL scores were cut into 3 equal groups to represent HL categories into Inadequate Health Literacy (IHL) (below the scores of 211.0000), Marginal Health Literacy (MHL) (between 211.0000 and 261.0000 scores) and Adequate Health Literacy (AHL) (the scores above 261.0000). A similar categorization has also been employed by Gazmararian, *et al.*, (2003) in their study on HL. Frequencies and percentages were used to present HL categorization. Descriptive statistics were



employed in the analysis of the HL. An individual's HL was indicated by how that particular individual finds it 'very difficult', 'difficult', 'easy' or 'very easy' if s/he was to engage herself in a task related to a particular health relevant area(s) (health care, disease prevention, health promotion) and information processing stages (access, understand, appraise, apply) related to health relevant decision-making. This means an individual responding 'very difficult' for all items would have scored 141 points and 'very easy' scoring 564.

A documentary review research method was used to collect relevant information on the status and extent to which HL in the context of One Health Approach has been researched on and documented in Tanzania. Similarly, documentary review was employed to collect information on current knowledge on HL assessment tools and approaches. A bivariate Pearson correlation was used to analyze the strength and direction of linear relationships between HL and some other continuous variables under the study.

IBM-SPSS v20 and Gretl software were used to compute frequencies, percentages, mean and maximum scores, chi-square and coefficients of correlation. All statistical tests were considered significant at p-value < 0.05.

3.0 Results

3.1 Socio- demographic characteristics of the respondents

The findings in Table 1 show that about 29.2% (95% CI: 23.3 to 35.0) were aged from 30 to 39, and 3.8% (95% CI: 1.7 to 6.2) were above 70 years. The average age was 43.7 years (95% CI: 43.1 to 44.4 years), and the highest age and the lowest age were 21 and 72 respectively. The majority (52.1 %) (95% CI: 49.6 to 54.7) were women. More than one-third (39.2%; 95% CI: 36.6 to 41.7) had not gone to school at all, and 57.5% (95% CI: 50.9 to 63.8) were married. The average HH size was 5 (95% CI: 5.08 to 5.28) members; the smallest HH size (minimum) had 1 member while the largest household size (maximum) had 10 members; and 62.9% of the HHs had 1 to 5 members.

Table 1: Socio-Demographic Characteristics of the Respondents (n=1440)

Variable	Categories	Percentage
Age in years	21-39	42.1
	40-49	26.3
	50-59	17.1
	60-69	10.7
	≥ 70	3.8
Level of Education	Not gone to school at all	39.2
	Universal adult education	2.5
	Primary school	30.0
	Secondary school	8.8
	Post-secondary /vocational	10.4
	University	9.2
Sex	Male	47.9
	Female	52.1
Marital Status	Never married/Single Married	30.4



	Married	57.5
	Separated	1.7
	Widow	5.4
	Widower	2.5
	Cohabiting	0.8
	Too young to marry	1.7
Household Size	1-3	21.7
	4-7	65.9
	>8	12.4

3.2 Health Literacy under the Humans, Animals and the Environment Interface

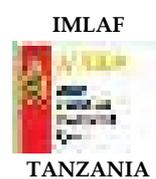
The results indicate that the HL mean score was 261.9 (95% CI: 257.6 to 266.4) while the maximum and minimum scores were 141.0 and 501.0 respectively with a Std. deviation of 85.0 (95% CI: 81.4 to 88.3). Table 2 presents HL results in categories; the results indicate that 36.3% (95% CI: 33.7 to 38.9) of the respondents had IHL, 30.8 % (95% CI: 28.4 to 33.3) with MHL and 32.9% (95% CI: 30.3 to 35.3) had AHL.

Table 2: Health Literacy categories (n=1440)

Health Literacy Categories	Frequency	Percent	95% Confidence Interval	
			Lower Bound	Upper Bound
Inadequate Health Literacy (IHL)	522	36.3	33.7	38.9
Marginal Health Literacy (MHL)	444	30.8	28.4	33.3
Adequate Health Literacy (AHL)	474	32.9	30.3	35.3
Total	1440	100.0		

3.3 Correlates/ Associates of HL

The results from Pearson correlation indicate that HL is significantly associated with group of attitudes ($r=0.135$, $p<0.01$: the higher HL, the positive attitudes HEB), levels of engagement in health related discussion ($r=0.609$, $p<0.05$: the higher engagement, the higher HL), health behaviours categories ($r=-0.648$, $p<0.05$: the larger HL, the lower involvement in HIB) and category of information seeking ($r=0.753$, $p<0.05$: the higher level of information seeking, the higher HL). The results indicate that when these variables change, HL also changes. Literally the results signify that a higher HL reflects negative attitudes towards HIB, while the higher engagement in health related discussion was found to correlate to higher health literacy whereas higher HL was found to influence lower HIB and active information seekers were found to have higher HL.



3.4 NNBHL Research Initiatives and Interventions under OHEA in Tanzania

Notwithstanding the growing attention for the concept of HL globally among health policymakers, researchers and practitioners (Sørensen *et al.*, 2015; European Commission, 2007; United Nations Economic and Social Council, 2009; WHO, 2012a), the situation in Tanzania is not different from situations in the rest of Africa, where very little has been researched and also documented on HL. In most countries in Africa, national overall initiatives for HL have not yet been institutionalized, that is there is no governmental policy related to health literacy (WAHO, 2009; IOM, 2013). It can be noted that there exist no health data sets with the HL variable. Obviously, the reality with respect to the population wide HL is then not known in Tanzania.

No evidence exists in the literature on having HL researched and documented adequately in Tanzania; what exists is very limited. For example, a study by Stone *et al.* (2011) dealt with evaluation of the utility of IEC materials for increasing patient HL and how patients perceive such materials on HIV/AIDS. Freer (2015) conducted A Comparative Study of Health Literacy and How Rural Communities Understand Hypertension Information in Uganda and Tanzania. Despite having very limited studies on HL, still none of the few available have focused on OHA which takes into account the interface of the interaction of animals, humans and the environment. This, however, does not point out to the fact that the place and relevance of HL is not recognized by health policymakers, researchers and practitioners in Tanzania. Studies by Kambarage *et al.*, (2003) and Karimuribo (2007) indicate the value of public health education programmes and how they could impact on public health outcomes under One Health Approach.

3.5 HL Measurements/Assessment: A Global Overview

In order to develop a context specific OHA based assessment tool, numerous empirical studies covering tools and approaches on HL measurements/assessment were reviewed. A study by Sun *et al.* (2013) was conducted to develop and validate a HL model at an individual level that could best explain the determinants of HL and the associations between HL and health behaviours even health status regarding infectious respiratory diseases. Skill-based HL test and a self-administrated questionnaire survey were conducted among 3222 Chinese adult residents.

The European HL Survey (HLS-EU, 2012:4) was conducted across eight European countries. In each country, a random sample of approximately 1000 EU-citizens, 15 years and older, were interviewed yielding a total sample of approximately 8000 respondents. Data were collected face to face via a standardized questionnaire. To measure HL, HLS-EU-Q was derived from the conceptual model and the definition developed by the HLS-EU consortium (Sorensen, 2012). The conceptual model integrates three health relevant areas (health care, disease prevention, health promotion) and four information processing stages (access, understand, appraise, apply) related to health relevant decision-making and tasks. These areas and stages, combined, create a matrix for measuring HL (HL) with 12 sub-dimensions, which were operationalized by 47 items. The 47 items were assessed using a 4-point self-report scale



(very easy, easy, difficult, and very difficult) to measure the perceived difficulty of selected health relevant tasks. Therefore the HLS-EU-Q refers to self-perceived measures of HL and reflects interactions between individual competences and situational complexities or demands.

The National Assessment of Adult Literacy (NAAL) was extremely important as the first national measure of literacy, providing systematic feedback to the education system and to the health care system about how literate American adults are. (IOM, 2009). Through the NAAL, an overall assessment of the level of literacy of American adults was obtained, among other. Out of that, numerous research measures (i.e. Test of Functional HL in Adults -TOFHLA and the Rapid Estimate of Adult Literacy in Medicine-REAL) have been used to analyse the impact of numerous interventions on individuals with limited HL. Researchers have used these measures to conduct studies that have shaped the field of HL (Baker *et al.*, 2006). Obviously, the feedback from the National Assessment of Adult Literacy (NAAL) demonstrated that the level of information conveyed by these systems did not well match with the abilities of most adults hence contributed to problematic, inadequate or low HL (IOM, 2009). This feedback created a very important entry point to the designing of the study conducted in Morogoro. This is simply the observation made was that the government in Tanzania had made efforts in improving health services and educating people to become health literate; still notable existence of health impairing practices/behaviours and varying preferences for Tanzanians in terms of seeking healthcare services instead of going to hospital (URT; 2003a; 2007a; 2007b). This then reflected the fact that there is a need to investigate whether the level of information conveyed through these efforts was a good match with the information requirements among Tanzanians towards HBs change.

4 Discussion

4.1 Health Literacy under the Humans, Animals and the Environment Interface

The trend indicates that IHL is reported to be a common occurrence throughout the world ((IOM, 2004; Kutner, *et al.* 2006; WHO, 2013). Both low and limited HL levels have been observed to be common even in economically advanced countries with strong education systems (Sørensen *et al.*, 2015), though the situation is reported to be worse in the developing part of the world (Muhanga and Malungo, 2018a). Such individuals have problems with interpreting statistics and evaluating risks and benefits that affect their health and safety. This implies that lack of skills needed to manage health and prevent disease appears regardless of a country's level of development.

4.2 Associates /Correlates of HL

Innumerable studies (see for example; Paasche-Orlow and Wolf, 2007; Sun *et al.*, 2013; WHO, 2013; Nutbeam *et al.*, 2017; Clouston *et al.*, 2017) have discussed the determinants of HL. Similar findings are reported on the correlates of HL. In a study by Sun *et al.* (2013), a significant difference between the unmarried and married groups in terms of their level of HL is reported. In the same study, HL was found to be affected by prior knowledge ($\beta = 0.245$). Other studies are also reporting prior knowledge to influence HL (Lee *et al.*, 2004; Paasche-Orlow and Wolf, 2007; von Wagner *et al.*, 2009). The



implication here is that a person with more health knowledge is better able to obtain, comprehend and use health information. Adams, (2010) reports on correlation between HL and attitudes towards health impairing behaviour, while US Department of Health and Human Services-HRSA, (2015) documents correlation between HL and levels of engagement in health related discussion. Others (Davis, 2002; Sun *et al.*, 2013; Schwartzberg and Wang, 2005; Miller, *et al.*, 2007; Nutbeam, 2008) reported correlation between HL and health behaviours and HL and information seeking correlation has been documented by Gutierrez *et al.*, (2014) and Jeong and Kim, (2016).

4.3 HL Research Initiatives and Interventions under OHA in Tanzania

Despite the situation observed with respect to HL research initiatives and interventions under OHA in Tanzania, it can be observed that there are several policy landmarks that are encouraging comprehensive HL initiatives. These policies include National Health Research Priorities (2006-2011) which has listed health information being among priorities (NIMR, 2013), One Health Strategic Plan (2015 - 2020) which recognizes the fact that attainment of optimal health for humans, animals and the environment requires collaborative efforts between various stakeholders from humans, animals and the environment health related matters (CDC, 2018); National eHealth Strategy (2012-2018) which supports improved multi-way communication and sharing of information among clinicians, patients, and caregivers within the health sectors and across partner agencies (Ministry of Health and Social Welfare, 2013). Together with these policies, the National Health policy of 2007 aims at creating awareness in individual citizens of responsibility for personal health and health of their family (URT-MOH, 2007). Obviously, such policy landmarks can influence effective HL Research Initiatives and Interventions under OHEA in Tanzania.

4.4 HL Measurements/Assessment

Through a review of literature, it has become apparent that most of the approaches used to measure HL had limitations. A study by Sun *et al.* (2013) concentrated at individual levels and but the rest of other studies (Sun *et al.*, 2013; HLS-EU, 2012:4; IOM, 2004) were conducted in a different socio-economic and political reality of Tanzania and did not examine the role of cognitive variables (such as health beliefs, attitudes, self-efficacy) as described in psychological models in understanding the distribution/prevalence of HL and HB. It is worth noting that all these studies reviewed (Sun *et al.*, 2013; HLS-EU, 2012:4; IOM, 2009; IOM, 2004) none of them took into account the inextricable link existing among humans, animals and environmental health.

HL is context specific, i.e. its function, acquisition and application should be studied and understood in the light of distinct contextual conditions (Kickbusch and Maag, 2006; Pleasant and Kuruvilla, 2008; Freedman *et al.*, 2009). It is obvious that public health and clinical settings may each require a different research approach to HL (Sorensen *et al.*, 2012). This means a need for a context specific approach to measure it. In this study, an approach was developed that takes on board the observed limitations from the review, and it was employed in this study.



5. Conclusion and Recommendations

Obviously, attainment of quality of population in Tanzania depends much on the health literacy which also influences health. It can be noted that attainment of good health relies on the HL up scaling through research and interventions under the interface of humans, animals and the environment (OHEA). It is apparent that for HL to effectively influence quality of population, hence improving health the stakeholders (the government and non-governmental organisations) have to put emphasis in terms of interventions which will improve on the factors which have been found to associate/correlate with HL. These interventions should facilitate engagement in health-related discussion and health information seeking which are likely to impact on health behaviour.

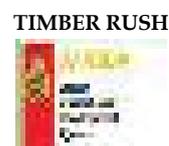
Policy landmarks in Tanzania do provide an avenue which could best provide room for effective HL research and interventions despite little that has been done. This study has developed a tool specifically for measuring HL in the context of the interaction of humans, animals and the environment. Other studies can be conducted to assess HL in other areas of Tanzania and beyond using this tool; these studies will fill in the gap in the national health research which at the moment has been very little on this important aspect. Understanding how health literate people are in the context of OHA will facilitate attainment of optimal health for humans, animals and the environment. Since low HL has been observed, it is worthwhile for HL initiatives to be promoted by the government and non-governmental organisations. Definitely, the findings from this study will assist to fill a gap in national health data sets which lacked measurements in HL and can provide baseline information towards formulation of HL interventions, research agenda and programmes.

Acknowledgement

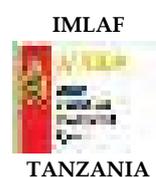
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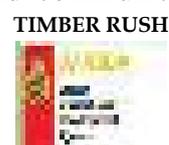
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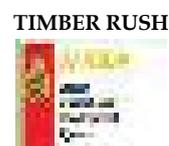
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