

ACTIONS FOR THE PREVENTION AND CONTROL OF ZONOSSES IN HEALTH EDUCATION: A SYSTEMATIC REVIEW AND META-ANALYSIS

Paula Ferraz de Camargo Zanotto¹
Mariana Zanchetta e Gava²
Dayane da Silva Zanini²
Helio Langoni³

ABSTRACT

Diseases arising from the imbalance between the triad environment, humans, and animals affect individuals' health, as well as the social, and economic well-being of the world's population. Across the globe, health education activities are being conducted to prevent and control zoonoses. To guide future educational interventions, we reviewed scientific articles published in the last five years to characterize and verify the tools: target audience, duration, effectiveness, and gaps and difficulties. Four databases were searched, and 16 articles were selected for the meta-analysis, with 81.3% of the studies being conducted in underdeveloped or developing countries. Of these, 56.3% involved children under 14 years of age, and 62.5% involved activities in elementary and middle schools. The researchers are the professionals who are the most engaged in the activities, and 56.3% of the studies are conducted by veterinarians. Several new teaching tools have been proposed, demonstrating remarkable effectiveness. For systematic reviews to provide a guide for the design of new educational activities, it is necessary to better describe teaching methodologies and evaluation tools, as well as to evaluate in the long term, not only the impact of knowledge on the population but also the incidence of zoonoses.

Keywords: Educational intervention, health promotion, public health, zoonotic diseases

AÇÕES DE PREVENÇÃO E CONTROLE DE ZONOSSES NA EDUCAÇÃO EM SAÚDE: UMA REVISÃO SISTEMÁTICA E METANÁLISE

RESUMO

As doenças decorrentes do desequilíbrio entre a tríade ambiente, humanos e animais afetam a saúde dos indivíduos, bem como o bem-estar social e econômico da população mundial. Em todo o mundo, atividades de educação em saúde estão sendo realizadas para prevenir e controlar zoonoses. Para orientar futuras intervenções educativas, revisamos artigos científicos publicados nos últimos cinco anos para caracterizar e verificar as ferramentas: público-alvo, duração, efetividade, lacunas e dificuldades. Quatro bases de dados foram pesquisadas e 16 artigos foram selecionados para a meta-análise, com 81,3% dos estudos sendo conduzidos em países subdesenvolvidos ou em desenvolvimento. Destes, 56,3% envolviam menores de 14 anos e 62,5% envolviam atividades no ensino fundamental e médio. Os pesquisadores são os profissionais mais engajados nas atividades, sendo que 56,3% dos estudos são conduzidos por veterinários. Várias novas ferramentas de ensino foram propostas, demonstrando notável eficácia. Para que as revisões sistemáticas orientem o desenho de novas ações educativas, é necessário descrever melhor as metodologias de ensino e os instrumentos de avaliação, bem

¹ Residente no Department of Animal Production and Preventive Veterinary Medicine, State University, Botucatu, São Paulo Brazil. paula.zanotto@unesp.br

² Mestranda no Department of Animal Production and Preventive Veterinary Medicine, State University, Botucatu, São Paulo Brazil. mariana.z.gava@unesp.br

³ Docente do Department of Animal Production and Preventive Veterinary Medicine, State University, Botucatu, São Paulo Brazil. *Correspondência: helio.langoni@unesp.br

como avaliar a longo prazo não só o impacto do conhecimento na população, mas também a incidência de zoonoses.

Palavras-chave: Intervenção educativa, promoção da saúde, saúde pública, doenças zoonóticas

ACCIONES PARA LA PREVENCIÓN Y CONTROL DE LAS ZOONOSIS EN LA EDUCACIÓN PARA LA SALUD: UNA REVISIÓN SISTEMÁTICA Y METANÁLISIS

RESUMEN

Las enfermedades derivadas del desequilibrio entre el medio ambiente, los seres humanos y los animales afectan la salud de las personas, así como el bienestar social y económico de la población mundial. En todo el mundo se están realizando actividades de educación sanitaria para prevenir y controlar las zoonosis. Para orientar futuras intervenciones educativas, revisamos artículos científicos publicados en los últimos cinco años para caracterizar y verificar las herramientas: público objetivo, duración, efectividad, vacíos y dificultades. Se realizaron búsquedas en cuatro bases de datos y se seleccionaron 16 artículos para el metanálisis, y el 81,3 % de los estudios se realizaron en países subdesarrollados o en vías de desarrollo. De estos, el 56,3% involucraba a niños menores de 14 años y el 62,5% involucraba actividades en educación primaria y secundaria. Los investigadores son los profesionales más comprometidos con las actividades, siendo el 56,3% de los estudios realizados por veterinarios. Se han propuesto varias herramientas didácticas nuevas que han demostrado una eficacia notable. Para que las revisiones sistemáticas orienten el diseño de nuevas acciones educativas, es necesario describir mejor las metodologías docentes y los instrumentos de evaluación, así como evaluar a largo plazo no solo el impacto del conocimiento en la población, sino también la incidencia de las zoonosis.

Palabras clave: Intervención educativa, promoción de la salud, salud pública, enfermedades zoonóticas.

INTRODUCTION

One health is closely intertwined with the health of the environment, humans, and animals. Factors that can influence the incidence of zoonoses include changes in land use, movements of animals and food, intensification of the interaction between wildlife and livestock or humans, such as deforestation and urbanization, migration due to war, and the effects of climate change, in addition to the lack of access to basic sanitation (1–5). Health education in this context becomes one of the most important means of informing society about the risks and consequences of infection by a zoonotic pathogen. Despite the lack of governmental financial resources, this tool can be used in restricted, marginalized, and neglected social areas (6,7).

The education of health aims to work pedagogically with the human being and the groups involved in the process of popular participation, by stimulating learning and investigation to further the development of the ability to critically analyze reality, modify behavior, inspire cultural changes, improve fighting and coping skills (6).

With educational interventions using languages and practices appropriate to each context and to the local needs, it is possible to empower the population, produce and direct their knowledge to themselves and their community, defending everyone's health (8). Many efforts

have been made in recent years to prevent and control zoonotic diseases through health education. However, the results of these efforts are rarely studied.

The objective of this study is, therefore, to characterize and verify, based on publications from 2013 to 2018, which are the most used tools, the target audience, the duration, and effectiveness, as well as identify gaps and difficulties, as a guide and guidance for future educational interventions.

MATERIALS AND METHODS

An analysis of scientific articles published in the period comprising the five years prior to the research (between 2013 and 2018) that addressed health education actions for the control of zoonoses was made to verify their effectiveness, by analyzing the country of origin, the average age and gender of participants, the professionals involved, the zoonosis addressed, the tools used, the duration and the impact of the actions. PubMed, LILACS, SciELO, and MEDLINE were the databases used. The descriptors "health promotion" OR "health education" OR "education" OR "campaign" OR "intervention", combined with the keyword "zoonoses" were used. Articles were screened for inclusion based on a detailed description of the actions, containing the learning resources used (materials, type of approach), a comparison between a control group and a group that received the educational intervention; and the level of learning expressed in numbers or percentages in English or Portuguese. Articles without pre-and post-intervention evaluations and articles with non-numerical results were excluded. So, the effects of educational actions could be compared, and the post-intervention or final score (FS) was subtracted from the pre-intervention or initial score (IS) since these data were available in all studies. In studies that evaluated more than one type of score, the average of the initial and final scores was calculated.

RESULTS

In total 713 publications were identified in the databases, of which 19 were considered suitable for review. Three articles were excluded because they did not numerically present the results of educational interventions, therefore, 16 studies were analyzed, as shown in figure 1.

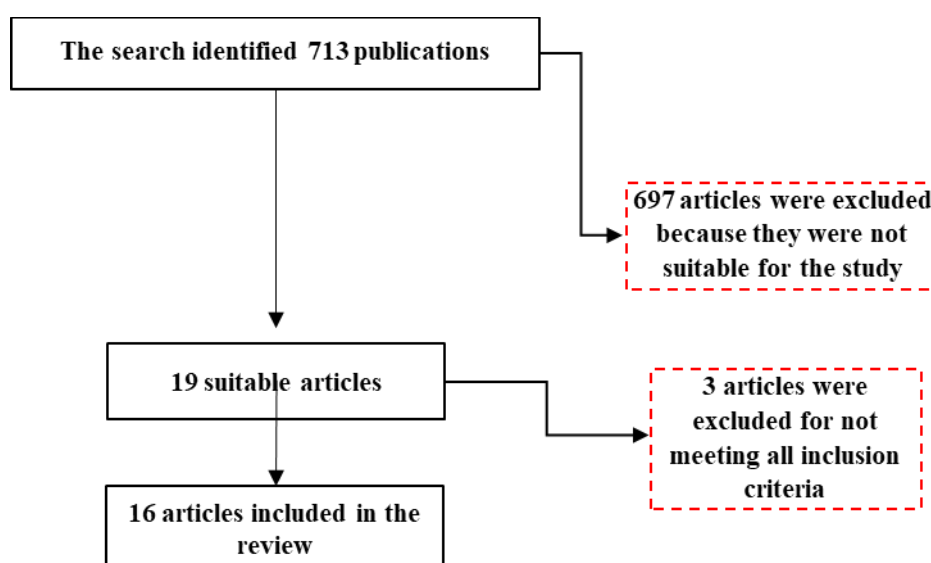


Figure 1. The flowchart of the systematic review.

Among the 16 articles identified, 13 were published in English and 3 in Portuguese, with the last ones conducted in Brazil. Nine studies (56.3%) were conducted by veterinarians, three (18.8%) by physicians, two (12.5%) by nurses, one (6.2%) by biologists, and one (6.2%) by zootechnicians.

In the American continent, 37.5% of the studies were published, followed by Asia with 31.3%, Africa with 18.8%, and Eurasia with 12.5%. In addition, five publications were launched in 2015, representing 31.3% of all publications. According to table 1, rabies represented 25% of the diseases targeted by health education actions.

Table 1. Characteristics of the studies included in the review.

Publication year	First author's surname	Country	Zoonosis/Topics covered
2013	Lobo (9)	Brazil	Leishmaniosis
2013	Moreira (10)	Brazil	Larva migrans, toxoplasmosis, amebiasis and leptospirosis
2014	Çövener Özçelik (11)	Turkey	Hygiene
2014	Heinrich (12)	United States	Hand hygiene
2014	Aligol (13)	Iran	Brucellosis
2015	Jacob (14)	India	Leptospirosis
2015	Mwidunda (15)	Tanzania	Taeniasis-cysticercosis complex
2015	Brito (16)	Brazil	Visceral leishmaniasis
2015	Suwanbamrung (17)	Thailand	Dengue
2015	Kanda (18)	Sri Lanka	Rabies
2016	Shadick (19)	United States	Lyme disease
2017	Auplish (20)	India	Rabies
2018	Hasanov (21)	Azerbaijan	Rabies
2018	Nolting (22)	United States	Influenza
2018	Hobbs (23)	Zambia	Taeniasis-cysticercosis complex
2018	Bailey (24)	Malawi	Rabies

Table 2 shows that 56.3% of the studies involved educational interventions with children up to 14 years of age. Table 3 describes the types of intervention and tools used in each study, as well as the characteristics of each study.

Table 2. Demographic characteristics of the populations of the analyzed studies.

Age	Nº Articles	%
Children (≤ 14 years)	9	56.3
Adult (≥ 20 years)	4	25
Young (15-19 years)	3	18.7
Sex		
F	15	93.75
F	1	6.25

Nº: numbers; F: female; %: percentage.

Table 3. Analyzed educational interventions are classified according to their types and tools used.

Studies	Nº	%
Type of intervention		
Elementary and high school activities	10	62.5
Community-based training	4	25
Activities related to higher education	2	12.5
Tools used *		
Digital resources	9	29
Folders	6	19.4
Lecture	6	19.4
Real-life simulations	4	12.9
Games	2	6.4
Question and answer method	2	6.4
Text messaging (mobile)	1	3.2
Brainstorming	1	3.2

*In some studies, more than one tool is used.

According to table 4, health researchers represent the class of professionals most involved in the review actions, participating in half of the selected studies. Human resources from different professions were used in some studies.

Table 4. Professionals involved in health education studies, analyzed.

Profession	Nº Studies	%
Researchers	8	38,1
Other health professionals	5	23,8
Primary school teacher	4	19,0
College students	3	14,3
Secondary school teachers	1	4,8

Nº: numbers; %: percentage.

Table 5 also provides information about the duration of each educational intervention, as well as its impact on the population's knowledge both immediately and after a few months. An increase of 80% in post-intervention knowledge represented the largest impact on knowledge.

Table 5. Duration of educational interventions and their impact on knowledge level.

The first author's last name (Ref)	Duration of the intervention (in days)	Immediate impact %	Impact after months%	The time between the 1st and 2nd assessments (in months)
Suwanbamrung (17)	90	80	-	-
Auplish (20)	1	59	-	-
Lobo (9)	1	53.2	38	2
Moreira (10)	1	55.9 /43.0/8.2	-	-
Brito (16)	1	-	52.6	3
Heinrich (12)	60	37.8	22.5	3
Bailey (24)	1	32.9	29.6	2
Shadick (19)	1	32.4	-	-
Hasanov (21)	365	-	28	-
Kanda (18)	60	30.9	-	-
Jacob (14)	1	26	-	-
Hobbs (23)	1	25	-	-
Nolting (22)	180	21.7	-	-
Çövener Özçelik (11)	1	19.2	22.8	1
Mwidunda (15)	1	10	10	6
Aligol (13)	5	8.2	6.6	1

-: No results.

DISCUSSION

Many studies were conducted in developing or emerging countries where there are vulnerable populations, risk factors, and significant health problems, such as the transmission of zoonosis. So, the authors chose to carry out interventions in these places to provide knowledge about health and, in turn, physical, mental, and social well-being related to the endemic diseases that affect them.

Among the diseases examined, rabies stood out with 25%. It is one of the deadliest zoonoses, and kills approximately 60 thousand people each year worldwide, primarily children in developing countries (25). The countries in which the activities took place were Sri Lanka, Azerbaijan, India, and Malawi, all countries within this economic classification, except for Malawi, are considered underdeveloped.

In 56.3% of the studies, the target population was children up to 14 years old, while 62.5% were from primary to high schools. It is believed that this age group is the most receptive and capable of assimilating and retaining information (26). They are also information disseminators and "vanguards" of behavioral change because of the high degree of socialization within a family, community, school, or even between schools (15,26); so, these reasons justify the preference for this age group.

The use of digital resources accounted for 29% of the tools used in these studies. Based on this, it is evident that technology-based methodologies are increasingly sought. Drawings, videos, games, and computer programs make providing information more engaging, reducing personnel training costs and providing standardized educational messages (23).

Hasanov et al. (21) used telecommunications to spread information about rabies risk among 800 cell phone numbers randomly chosen at random. Using a computer game with animations, Hobbs et al., (23) developed activities to promote knowledge about *Taenia solium* to children with an average age of 14 years. Simulations, demonstrations, and scenarios, the third most used tool (12.9%), can be used to contextualize educational content when computers or projectors are unavailable, thus creating a link between knowledge and practice, exposing users to the risk factors to be recognized (26) and low cost (24). However, folders and lectures (19.4%) continued to play a huge role in health education in the last five years, often used in an integrated way, with folders serving as support material (11).

With 38.1% of the interventions studied, the profession of the researcher was most involved, likely due to the lack of investments by the public sector in health education, which is necessary to complement or maintain the actions by other types of resources. Five studies (23.8%) did mention the participation of public officials, showing that in several countries partnerships and collaborations between different sectors are common, such as secretariats for universities, health, and education.

These actions go accordingly to the proposal done in 1946, at a meeting of the World Health Organization (WHO), encouraging public health activities, including the control of zoonoses. Also, the multidisciplinary approach directly corroborates with the concept of one health (3,5).

Sixty-two percent of the workers had only one day of activity, which lasted approximately 50 minutes. It shows that even with a short lesson, knowledge about diseases and their prevention measures can improve significantly and remain high for several months (24).

The effects are even more promising when coupled with other control measures. Hasanov et al. (21) conducted a study in Azerbaijan and found that after one year of the educational campaign, 80% of the population in the intervention group had vaccinated their dogs against rabies, compared to 52% in the control group.

The impact of activities was examined in only seven (7/16) studies after a few months, but they did not last long enough to determine the long-term incidence and prevalence of diseases. Lemkuhl et al. (27) and Sivaramalingam et al. (28) also found similar results when addressing health education initiatives in different areas of study in their reviews.

According to the authors, although the effectiveness rates have mostly declined between the first and second post-intervention assessments, they remain satisfactory when compared to the baseline assessment. Lobo et al. (9) concluded that for there to be no decline over time, education activities, such as campaigns, should continue, involving communities in reducing risk factors for zoonoses.

CONCLUSION

In the short term, health education is effective in raising knowledge. To fully assess the effects on zoonotic disease control and prevalence, teaching methodologies and assessment instruments need to be better described, along with long-term follow-up studies.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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