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A COMMUNITY-BASED INTERVENTION FOR INCREASING ACCESS TO HEALTH INFORMATION IN RURAL SETTINGS*

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Abstract

The health information needs of people living in rural areas are unmet. We aim to report on the results of the IRIS institutional- and population-level intervention designed to improve access to health information in rural settings. The intervention consisted of three components: equip local libraries with health-related books, train librarians to refer them to locals, and enhance locals' health information seeking behavior, self-efficacy, and health literacy. Data was collected using a mixed-methods strategy of inquiry in 2010 and 2011 from 822 adult inhabitants from four rural communities in Cluj county, Romania, using a nonrandomized control-group pretest-posttest study design. We used the Kruskal-Walis one-way analysis of variance to determine statistically significant differences between the two study groups.

Results show that individuals from rural communities included in the intervention group were more engaged in health information seeking, had higher self-efficacy in reading and understanding health-related materials, and reported higher frequencies of asking about and borrowing books on health themes from the village library as compared to respondents in the control group. As the IRIS initiative made use of available community resources and proposed only several incremental changes within the librarian system, this intervention has a major potential of sustainability and replicability.

Keywords: rural, health information, access, library, Cluj county, Romania.

1. Introduction

Despite their poorer health status and greater health-related needs (Strasser, 2003; Bennett, Olatosi and Probst, 2008), residents of rural and remote settings have limited access to health services (Goodridge and Marciniuk, 2016), healthcare workforce (Steinhaeuser *et al*., 2014), and health information (Carlson *et al*., 2006; Smith, Humphreys and Wilson, 2008), especially in low and middle income countries such as Romania (Vlădescu *et al*., 2016). In this context, when facing health risk situations, rural residents commonly rely on family networks and friends for support and advice (Wathen and Harris, 2007). However, recent findings suggest that libraries, through the help of trained librarians, could meet the health information needs of people living in rural and remote settings (McKeehan, Trettin and May, 2008; Morgan *et al*., 2016; Zager *et al*., 2016).

The rationale underpinning this type of initiatives is that, in order to ultimately promote and maintain the health of individuals and communities, providing health information should be complemented by increasing the health information seeking behavior of rural inhabitants. A coping strategy in threatening health-related situations, the health information seeking behavior encompasses purposive activities undertaken by individuals in order to manage their health symptoms and improve their health outcomes (Weaver *et al*., 2010). By considering this definition, an active health information seeking behavior would be essential to ensure the use of health information available within libraries. In addition, there are at least two other concepts strongly related to health information seeking and conducive to access of health information: one's self-efficacy and health literacy level.

By significantly affecting people's level of motivation, self-efficacy can determine the choice of engaging in specific behaviors and the amount of effort committed to it (Vancouver, More and Yoder, 2008). Furthermore, understanding health information is just as important as finding the most relevant sources. Thus, an adequate health literacy level enables individuals to interpret and act upon the acquired health-related information (Sørensen *et al*., 2012). Therefore, self-efficacy and health literacy should be taken into account when assessing health information seeking behavior and its role in strategies designed to promote public libraries as health information resources for rural inhabitants.

To the best of our knowledge, there is no information available from Eastern Europe on the types of interventions that would prove to be efficient in increasing access to health information and encourage health information seeking behavior in rural populations. In countries such as Romania, with a large rural (Trading Economics, 2016) and aging population (Marinca, 2017), and where resources invested in health promotion are scarce (European Commission, 2017), such evidence is essential to advance population health. Thus, this article aims to describe the evaluation results of exactly such an intervention.

2. Methods

2.1. Study design

We employed mixed-methods, nonrandomized control-group pretest-posttest study design to evaluate the efficiency of a participatory-based intervention, which aimed to improve access to health information in four rural settings. The main objectives were to (1) offer an institutional framework to facilitate access to health information (intervention at the institutional level), and to (2) increase community awareness, knowledge and skills to increase accessing of health information (intervention at the population level). Thus, at 6-months post-intervention we assessed its impact on increasing HISB and self-efficacy in searching for health information and improving health literacy.

2.2. Setting, participants, and sample

The study was implemented in four rural communities in Cluj county, Romania. Two of these communes were included in the intervention group (Sînpaul and Petreștii de Jos) and two in the control group (Tureni and Cătina). A short description of the four communes at the time of the study's implementation (years 2010-2011) is presented in Table 1.

Table 1: Description of the communes included in the study

Intervention communes	Control communes
Commune Sînpaul, Village Sînpaul	Commune Tureni, Village Tureni
Population of the commune: 2,652	Population of the commune: 2,209
Population of the village: 826	Population of the village: 929
Location: Road E81	Location: Road E60
Commune Petreștii de Jos, Village Petreștii de Jos	Commune Cătina, Village Cătina
Population of the commune: 1,891	Population of the commune: 2,209
Population of the village: 685	Population of the village: 819
Location: Road 107/L	Location: Road 109C

The study population consisted of a convenience sample of 822 community members, 18 and older, who consented to participate in the study after being approached in their courtyards or homes by trained study data collectors. In this paper, we report on the data collected in the post-intervention period only (N=416). We also conducted five semi-structured interviews with local stakeholders (i.e. mayor, librarian, family physician).

2.3. The Initiative for Health Information Resources in Rural Areas (IRIS)

The IRIS intervention was designed to improve access to health information in rural areas by facilitating the availability of reliable health information sources, training librarians to manage and refer them to locals, and enhancing rural inhabitants' health information seeking behavior, self-efficacy in searching health information, and health literacy. The intervention was structured on two levels: an institution-

al level and a population level, each being grounded in comprehensive theoretical frameworks.

Fig. 1: The IRIS non-randomized control-group pretest-posttest study design (N=822)

Communes	**2010** *Formative phase/ pre-test*	**IRIS** *the intervention*	**2011** *Evaluation phase/ Post-test*
Intervention (n=2)	**Quantitative methods** *(Survey, n=209)*	**Institutional level** ✓ Together for a Healthy Community (school, physician, town hall, library) ✓ Equip local libraries with health literature & train librarians to manage and refer them to locals **Population level** (workshops) ✓ About health and the medical system ✓ Principles of a healthy diet	**Quantitative methods** *(Survey, n=212)*
	Qualitative methods 10 interviews 6 focus groups		**Qualitative methods** 5 interviews
Control (n=2)	**Quantitative methods** *(Survey, n=197)*		**Quantitative methods** *(Survey, n=204)*

Figure 1: The IRIS non-randomized control-group pretest-posttest study design (N=822)

At the institutional level, we developed partnerships with local institutions in the two intervention communes, as well as with four national organizations willing to donate health-related books and pamphlets. The partnership with local stakeholders, such as town halls, libraries, schools, and family physician offices, was designed as a framework for the development of the population arm of the intervention. The collaboration with these institutions was established under the act 'Together for a Healthy Community', signed within the framework of the IRIS initiative, a document stipulating both the general objectives of the agreement, as well as the responsibilities of each partner. The general objectives of the agreement were to (1) increase the number of health-related materials available in the local libraries and to (2) obtain the support of local stakeholders for the implementation of the intervention.

At the population level, the intervention was theory-driven and developed based on the information collected during a formative research phase, having both a quantitative and a qualitative component and conducted in October-December 2010. A survey was used to evaluate the target population's health information seeking behavior, self-efficacy, attitudes, and barriers and benefits of health information seeking behavior. The qualitative component was developed on the results of the survey and consisted of two focus-groups (n=12). We sought to involve the members of the target audience in the development of the intervention, by determining approaches to reduce the existing barriers in seeking health information and maximize the perceived benefits of this behavior. Also, the project team gathered information about the preferences of the target audience concerning the time and place for the development of intervention activities. Nonetheless, these focus groups were used to pretest the printed intervention materials (brochures) and the visuals elements of IRIS (logo).

In order to maximize results, the intervention was branded under the name IRIS (The Initiative for Health Information Resources in Rural Areas), and pretested visual elements were designed in order to achieve high recognition among the target population. Local libraries were equipped with more than 300 books on health topics and instruments to manage the collections. Librarians were trained in administering the materials as well as collecting feedback from user for its improvement. Two health workshops were conducted in each of the intervention communities with the scope of increasing health information seeking behavior, build health literacy skills, increase self-efficacy in seeking health information as well as promoting IRIS.

2.4. Data collection

Pre- and post-intervention data was collected in all four communities, by trained data collectors, in October-December 2010 and October-November 2011. Data was collected using a structured pre- and posttest survey in the intervention group (n=209 pre- and n=212 post-) and in the control group (n=197 pre- and n=204 post-). A set of 5 individual interviews were also conducted in the post-intervention period with members of the local administration (i.e. mayor, librarian, family physician) in the intervention communes. In this paper, we report the data collected in the evaluation/ post-test phase.

2.5. Data and measurements

2.5.1. The quantitative component

The post-intervention survey consisted of seven sections. However, in this paper, we only report on the questions described below:

(1) Socio-demographics, such as age, gender, ethnicity, education, employment status, and monthly family income.

(2) The health information seeking behavior of the respondents, assessed using 9 items measured on a 5-point Liker scale (from 1=always to 5=never) and designed to evaluate the frequency of the respondents' health information seeking behavior in the last 12 months (i.e. how often they watched a TV show on a health issue, read a brochure on a head issue, discussed with friends regarding a health problem, asked their physician for additional information regarding a medical problem). In addition, two dichotomous questions (0=No, 1=Yes) were used to evaluate whether respondents have ever searched for information on a health problem from any source and if someone else has searched for health information on their behalf.

(3) Respondents' self-efficacy in searching and finding health-related information was assessed using a battery of 9 questions, grouped in three sub-scales. First, we evaluated subjects' self-efficacy in reading a book on health issues, in asking a friend or a family member to search for health information on their behalf, and in asking the librarian to search for health information on a 4-point Likert scale from 1 (=unsure) to 4 (very sure). Next, we inquired about individuals' abilities to search for health information when they are concerned, depressed, tired, or busy, or when they have

to perform the search for several times until they find what they need, using the same 4-point Likert scale mentioned above. Lastly, we asked participants to rate, on a scale from 1 (=very difficult) to 5 (=very easy) how difficult it would be for them to search for health information when they need it.

(4) We measured health literacy within the sample by using a battery of 8 questions initially developed by Chew, Bradley and Boyko (2004). In this paper, we report only 4 of these questions, measured on a scale from 1 (=always) to 5 (=never) and used to assess how often respondents ask someone else to read materials received from their doctor, understand written information regarding their medication, and understand prospectuses and physician indications.

(5) Respondents' attitudes towards the community library were evaluated by assessing the frequency with which the librarian recommended them a book on a health topic, as well as the frequency of intending to borrow, asking about, and borrowing a book on a health topic from the local library in the last year, with responses for these questions ranging from 1 (=always) to 5 (never). Nonetheless, we asked about the importance of the village library in having a well-informed community on health topics, with possible answer alternatives ranging from 1 (=very important) to 5 (=not important at all).

2.5.2. The qualitative component

The qualitative component consisted of a semi-structured interview guide slightly adjusted based on the role of the subject in the local administration (i.e. mayor, librarian, or family physician). Topics included the capacity of the IRIS intervention to facilitate access of rural communities to health information, recommendations on how to improve future similar initiatives, and sustainability issues. The interview guide was built to explore the specific role of the mayor, the librarian and the family physician in the delivery of the IRIS intervention, and the importance of the local library to have a well-informed community on health topics.

2.6. Data analysis

In this paper, we report analyses conducted on the post-intervention data only (N=416 surveys and 5 semi-structured interviews). For the quantitative component, we conducted descriptive statistics on the socio-demographic variables. We also used the Kruskal-Wallis one-way analysis of variance by ranks to evaluate the presence of statistically significant differences on the variables of interest between the intervention and control communes in the pre-intervention phase (not reported in this paper). In the post-intervention phase, we conducted the same Kruskal-Wallis test specifically for the variables for which we did not find any statistically significant differences in the pre-intervention phase, in order to identify any possible effects of the IRIS intervention.

For the quantitative component, we conducted verbatim transcription of the audio recorded semi-structured interviews and performed an inductive thematic analysis at the semantic level to identify codes and themes in the data.

3. Results

3.1. Results from the quantitative component

The post-intervention sample consisted of participants with a mean age of 52.51 years (SD=17.51, range 18-87), with the respondents in the intervention communes being slightly younger than the respondents in the control communes (mean age of 51.11 vs. 53.34). Most respondents were of Romanian ethnicity (94% in the control communes and 68.6% in the intervention communes), had a high school education (38.7% in the control communes and 32.5% in the intervention communes), and a monthly family income below 700 RON (41.7% in the control communes and 48.5% in the intervention communes). A detailed description of the sample is available in Table 2.

Table 2: Post-test data, sample description (%, N=416)

		Intervention communes (%)	Control communes (%)	Total (%)
Gender	Male	49.5	45.1	47.4
	Female	50.5	54.9	52.6
Age (mean, SD)	Under 30	16.7	11.3	14
	31-49	26.7	24	25.4
	50-59	16.6	24	20.3
	Over 60	40	40.7	40.3
	Mean/SD (range)	M=51.11 SD=17.31 (18-87)	M=53.34 SD=16.98 (18-85)	M=52.51 SD=17.15 (18-87)
Ethnicity	Romanian	94.8	68.6	82
	Hungarian	0.5	27.5	13.7
	Roma	4.2	3.4	3.8
	Missing	0.5	0.5	0.5
Education	No education	6.1	13.3	9.6
	Primary school	20.3	20.2	20.2
	Secondary school	25.0	30	27.5
	High school	38.7	32.6	35.8
	College or more	9.9	3.5	6.8
	Missing	0	0.5	0.2
Employment status (multiple or no answers allowed)	Employed	22.6	17.3	20
	Student	1.9	0.5	1.2
	Retired	46.2	44.3	45.3
	Farmer	14.2	10.3	12.3
	Freelancer	20.3	17.6	19
Estimated monthly family income	0-700 R0N	41.7	48.5	45.0
	701-1,500 RON	37.4	37.1	37.3
	1,501-3,000 RON	14.7	8.9	11.8
	3,001-5,000 RON	0.9	0	0.5
	Missing	5.3	5.5	5.4

Regarding the results of the Kruskal-Wallis one-way analysis of variance, these are presented in Tables 3-6; it is apparent from Table 3 that respondents from the intervention communes, as opposed to their counterparts living in the control communes, have searched more frequently for health-related information from any source in the last 12 months (χ2=19.735, p=.000, df=1), while the respondents from the control communes had someone else searching for this type of information for them (χ2=7.061, p=.008, df=1). On the other hand, participants from the control communes reported a higher frequency of reading the health section of a newspaper or magazine (χ2=8.148, p=.004, df=1) or of watching a TV show on health issues (χ2=7.321, p=.007, df=1) in the last 12 months. These statistically significant differences in the favor of the respondents in the control communes might be due to the fact that they are relying more on other sources to get access to health-related information, while their counterparts in the intervention communes reply more on the local library to get this information (hypothesis supported by the results presented in Table 6).

Table 3: Differences in the health information seeking behavior of respondents from the control and intervention communes in the post-intervention phase (results of the Kruskal-Wallis one-way analysis of variance; N=416)

Variable	Control (Mean rank)	Intervention (Mean rank)	Kruskal-Wallis test
Seeking health information from any source	181.24	220.21	χ2=19.735, p=.000, df=1
Someone else searching for information on their behalf	149.33	131.59	χ2=7.061, p=.008, df=1
Frequency of reading the health section of a newspaper or magazine	38.57	56.64	χ2=8.148, p=.004, df=1
Frequency of watching a TV show on health issues	38.93	55.86	χ2=7.321, p=.007, df=1
Frequency of reading a book (or fragment) on health issues	53.17	50.84	χ2=0.406, p=.524, df=1
Frequency of reading a pamphlet on a health issue	49.02	51.80	χ2=0.072, p=.789, df=1
Frequency of asking friends or relatives about health problems	47.69	53.01	χ2=0.306, p=.580, df=1
Frequency of discussing with friends or relatives about health problems	49.22	52.40	χ2=0.049, p=.825, df=1
Frequency of asking doctors extra information about a disease or medical problem problems	42.95	53.44	χ2=1.815, p=.059, df=1

As Table 4 shows, there is a statistically significant difference between the two study groups in terms of respondents' self-efficacy on reading a pamphlet with health information or a book/paragraph on health issues, with respondents in the intervention communes reporting better self-efficacy (χ2=4.497, p=.034, df=1 and χ2=8.406, p=.004, df=1). Similar results were reported by the subjects in the intervention communes when asked if they felt confident to research for health information even in situations when they are concerned, depressed, tired or busy. In addition, participants in the intervention communes reported better self-efficacy in searching for health information when they need as opposed to participants in the control communes (χ2=11.676, p=.001, df=1).

Table 4: Differences in self-efficacy of respondents from the control and intervention communes in the post-intervention phase (results of the Kruskal-Wallis one-way analysis of variance; N=416)

Variable	Control (Mean rank)	Intervention (Mean rank)	Kruskal-Wallis test
Self-efficacy on reading a pamphlet with health info	186.04	208.96	$\chi2$=4.497, p=.034, df=1
Self-efficacy on reading a book or a paragraph on health issues	180.18	211.90	$\chi2$=8.406, p=.004, df=1
Self-efficacy in asking a friend of a family member to search health information	195.39	197.61	$\chi2$=0.042, p=.837, df=1
Self-efficacy in asking the librarian to search for information of health topics	188.49	201.55	$\chi2$=1.184, p=.277, df=1
How difficult do you think it would be to search health information when you need them?	177.36	213.62	$\chi2$=11.676, p=.001, df=1
I can search for health information even when (…) I am concerned	165.79	224.36	$\chi2$=28.789, p=.000, df=1
(…) I am depressed	169.94	217.31	$\chi2$=19.161, p=.000, df=1
(…) I am tired	174.93	216.29	$\chi2$=14.355, p=.000, df=1
(…) I am busy	170.71	219.82	$\chi2$=20.857, p=.000, df=1
(…) If I must try several times until I find what I need	158.19	234.40	$\chi2$=47.749, p=.000, df=1

From the data in Table 5, we can appreciate that respondents in the intervention communes reported statistically significant better results for the four questions assessing health literacy components as opposed to their counterparts in the control communes. More specifically, statistically significant improvements have been observed between the control and intervention group in terms of health literacy.

Compared to the control group, respondents in the intervention group reported fewer problems in understanding written information regarding their medical conditions ($\chi2$=6.679, p=.009, df=1) and feeling less unsure when taking their drugs because of difficulties in understanding prospectuses ($\chi2$=20.823, p=.000, df=1) or physician's indications ($\chi2$=20.602, p=.000, df=1). Furthermore, they also reported needing less help from family members, neighbors or friends when reading materials received from their physician ($\chi2$=6.679, p=.009, df=1). These results suggest that the IRIS intervention had positive effects on individuals' health literacy levels.

Table 5: Differences in the health literacy level of respondents from the control and intervention communes in the post-intervention phase (results of the Kruskal-Wallis one-way analysis of variance; N=416)

Variable	Control (Mean rank)	Intervention (Mean rank)	Kruskal-Wallis test
Ask someone to explain written information regarding their medical condition	172.72	216.04	$\chi2$=15.530, p=.000, df=1
Feeling unsure when understanding prospectuses	171.14	220.98	$\chi2$=20.823, p=.000, df=1
Problems understanding physician indications	169.93	218.7	$\chi2$=20.602, p=.000, df=1
Help needed to read materials received from your doctor	184.39	213.68	$\chi2$=6.679, p=.009, df=1

Results in Table 6 show that in the intervention group, the village library had a more important role in having a well-informed community on health themes ($\chi2$=5.857, p=.016, df=1) as compared to the control group. Furthermore, respondents in the intervention group reported higher frequencies of intending to borrow ($\chi2$=6.361, p=.012, df=1), asking ($\chi2$=10.869, p=.001, df=1) and borrowing ($\chi2$=9.270, p=.002, df=1) a book on a health theme from the village library. The role of the village librarian in encouraging health information seeking through recommending books on health themes was grater in the intervention group ($\chi2$=10.983, p=.001, df=1) as compared to the control group.

Table 6: Differences in the attitudes of respondents from the control and intervention communes in the post-intervention phase towards the local library (results of the Kruskal-Wallis one-way analysis of variance; N=416)

Variable	Control (Mean rank)	Intervention (Mean rank)	Kruskal-Wallis test
Importance of a village library to have a well-informed community of health topics	131.51	111.87	$\chi2$=5.857, p=.016, df=1
Frequency of intending to borrow a book on a health theme	126.75	112.51	$\chi2$=6.361, p=.012, df=1
Frequency of asking about a book on health themes	128.59	111.82	$\chi2$=10.869, p=.001, df=1
Frequency of borrowing a book on a health theme	128.95	114.98	$\chi2$=9.270, p=.002, df=1
Frequency with which a librarian recommended a book on health issues	130.91	115.12	$\chi2$=10.983, p=.001, df=1

3.2. Results from the qualitative component

Five broad themes emerged from the qualitative data analysis. These are summarized below.

Theme 1: the perception of the local public administration representatives regarding the IRIS strategy. A variety of perspectives were expressed by interviewees, who saw the IRIS intervention as: (1) a means of health education for individuals living in rural areas – *'it is an educative initiative (…) and it fits into the specific of the activities designed to increase the awareness of the population in rural areas regarding what they need to do to maintain a good health, both from the perspective of prevention and treatment'* (mayor, intervention commune). (2) A support program for family physicians – *'for me [the IRIS intervention] represents a support'* (family physician, intervention commune), but also (3) as a means to reduce disparities in the access to health information between rural and urban areas – *'of course that the rural population is generally less informed, there is a gap between the city and the countryside (…) this project is very useful in this sense'* (mayor, intervention commune).

Theme 2: the capacity of the IRIS intervention to facilitate access of rural communities to health information. The analysis revealed that the IRIS intervention was effective in facilitating the access of rural inhabitants to health information. Yet, two main discourses emerged from the data explaining the lack of interest and involvement of some villagers for the IRIS intervention: (1) that only some population groups are interested in such initiatives – *'I believe that no program can have benefits for 100%*

of the population, because not everyone participates' (mayor, intervention commune) and (2) that individuals living rural settings prioritize working the land over their health – *'people in the countryside do not postpone working their land for anything in the world. So this is more important for them than their health'* (librarian, intervention commune).

Theme 3: the involvement of the local institutional actors in the IRIS intervention. The direct and active involvement of the institutional actors in this initiative has been done by promoting the lending of health-related books from the local library and by recommending the participation in the IRIS health workshops: *'we tried to be an active partner in this project. Personally, even when I left the church on Sundays, when it is fairly common to inform citizens, I promoted these activities (…) so we encouraged participation'* (mayor, intervention commune).

Theme 4: the sustainability of the project. The analysis revealed that there was a sense of support for the IRIS initiative even after the official end of the project, but the need to continue the initiative has emerged from the discourse of the interviewees. As one of the interviewee said: *'I hope you can continue this activity because they [people living in rural areas] have a constant need of support and motivation to access health-related information'* (family physician, intervention commune).

Theme 5: suggestions for future initiatives designed to increase access of rural populations to health information. In this respect, some interviewees argued that more should be done to involve the villagers in such activities by finding new dissemination and promotion strategies: *'we have to find some new ideas (…) something to attract them (…) even if they don't realize the importance [of participating in these activities]. It is difficult to gather people just by telling them you can offer them health-related information, because people don't always appreciate getting information'* (mayor, intervention commune); others expressed the need for a better involvement of the local authorities in such initiatives, because time and effort are needed to *'break down barriers of understanding and conception'* (family physician, intervention commune).

4. Discussion

The proposed Initiative for Health Information Resources in Rural Areas (IRIS), a pilot intervention implemented both at the population and institutional level in two rural communities in Cluj county, has been proven effective in enhancing access to health information in rural areas by (1) ensuring the availability of health information and (2) increasing the health information seeking behavior of rural residents. In terms of the availability of health information, the access to reliable information resources was ensured by equipping local libraries with books on health topics and training the librarians activating within the formal frameworks of village libraries to recommend these books. Regarding the health information seeking behavior of the population, the intervention was designed so as to increase individuals' knowledge and build up their health information seeking skills, with the ultimate purpose to promote the access and utilization of the available health-related resources. To the best of our knowledge, based on a rapid review of existing health literacy programs

implemented in Romania, there are no similar initiatives implemented in Romanian rural or remote settings.

The IRIS initiative and the results we are reporting are important from at least two perspectives: (1) they add to the body of information and literature on health literacy in Romania, which is currently scarce (Monceanu, 2015), and (2) they respond to the needs of rural inhabitants identified in the only health literacy-based study conducted in Romanian rural settings, which highlights low levels of health literacy among rural inhabitants (Pop *et al*., 2013). While access to health information was also found to be limited in most Transylvanian rural areas due to the lack of community libraries or the lack of health-related resources in the existing libraries (Baba *et al*., 2010), no information is available on the level of self-efficacy in searching for health information among the Romanian rural population. In this context, our results have the potential to significantly improve the current situation by enhancing rural inhabitants' access to health information and ultimately improve their health status.

More specifically, by employing the proposed population and institutional-level strategy, the intervention was successful in increasing the health information seeking behavior of the rural population, the self-efficacy of the individuals in searching for health information, and health literacy levels in the rural communities included in the IRIS intervention. Furthermore, as librarians were promoted as lay experts in health information resources, the role of village libraries in having a well-informed community on health themes was improved. As a result, individuals from rural communities included in the intervention group were more engaged in health information seeking and reported higher frequencies of asking about and borrowing books on health themes from the village library as compared to respondents in the control group. These results are similar with the ones obtained by similar programs implemented in the USA and designed to enhance the role of local libraries to improve population health (Morgan *et al*., 2016; Zager *et al*., 2016).

As the IRIS initiative made use of available community resources and proposed only several incremental changes within the librarian system, this low-cost intervention has a major potential of sustainability and replicability in other rural and remote settings across Romania. More specifically, the IRIS initiative was based on a collaboration between important community stakeholders (town halls, libraries, schools, and family physicians' offices) in the two intervention communes, established under the act 'Together for a Health Community'. By signing this act, the stakeholders have agreed to voluntarily support the initiative by offering their time and access to their facilities in order to support the implementation of the intervention. In addition, the intervention implementation costs were kept to a minimum by developing partnerships with four national organizations willing to donate the health-related books and pamphlets used to equip the local libraries participating in the IRIS initiative. This strategy made the IRIS initiative a financially viable, easily transferable, and simple intervention that can be implemented by rural communities and stakeholders across Romania to bring positive change in their inhabitants' health literacy levels.

The intervention's sustainability is ensured by the participation of both formal and informal community leaders, as well as inhabitants of rural areas in the process of development and implementation, in the formative research phase of the intervention.

Future interventions addressing the health information needs of people living in rural and remote settings should consider employing a twofold strategy designed to ensure both the access to health information resources, as well as the engagement of rural residents in health information seeking. In terms of the pursued strategy, the framework proposed and implemented at the institutional level within the IRIS intervention was successful in supporting the implementation of the intervention at the population level.

In conclusion, the access to health information of rural inhabitants with no or poor connections to external health information sources (such as physicians or the internet) can be enhanced by making health information resources available, increase inhabitants awareness regarding the availability of health information, as well as by training local librarians to manage and refer health-related materials to people visiting community libraries.

5. Limitations

This study has several potential weaknesses. Firstly, the proposed intervention addressed only specific aspects related to health literacy and failed to provide a comprehensive strategy designed to include this concept as a whole. Secondly, due to limited resources, only four rural communities were included in the study. As a result, the impact of each intervention component on increasing access to health information could not be assessed. Thirdly, the data collected and presented in this paper was based on convenience samples of the population in the four communities included in the study.

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