Primary Environmental Health Care in the Unified Health System and Local Environmental Problems: The Territory of a Basic Health Unit as Field of Action

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Abstract

The health sector has been urged to actively participate either by its traditional role in caring for populations affected by environmental risks, or by appreciating promotion actions. Within Primary Health Care (PHC), the Ministry of Health has Family Health Strategy (FHS) as its main strategy to reshape the healthcare model.

This paper aimed to make the environmental diagnosis of the municipality of Sao Jose do Sul, state of Rio Grande do Sul, describe the Environmental Health promotion process in Family Health Strategy, and discuss the involvement of environmental professionals in Primary Environmental Care (PEC). Questionnaires were applied to community health workers (CHW) and to the community, and interviews were conducted with workers of the primary health centers (PHC) and with municipal managers. The environmental characterization showed that the municipality suffers from problems related to rural practices, such as the use of pesticides, unauthorized burning, vectors and deforestation. Not to mention urban problems, such as lack of sanitation. Interviews with managers and health professionals showed that the concept of Environmental Health is not yet included in daily life, showing that this is a relatively unexplored field. This paper lists a series of actions that could be taken together with Environmental Engineering professionals, aiming to address environmental issues in the municipality of Sao Jose do Sul/RS, such as: training community health workers on the issue, use of pesticides, pig farming, sanitation, improved sanitation facilities (ISF) and municipal health workshops (MHW), organic waste and supply by artesian wells.

Keywords: Primary health care, Primary environmental care, Local environmental problems, Family health strategy, Community health worker, Unified health system

Background

The field of Environmental Health seeks to relate human health to factors of the natural and built environments that determines, conditions and influences it, through an interdisciplinary proposal, meeting the need to build landmarks, capable of mediating the complex relationship between environment, health and economic and social development [1]. Methodologies for studies and actions that relate to the relationship between health and the environment, taken as a whole or restricted to a particular environment, are necessarily more diverse and complex than in other areas of Collective Health [2].

In Environmental Health, there is an open and largely unexplored field. The diversity of research and intervention subject matters requires methodological complexity. Knowledge production and its use in environmental health surveillance actions require, as a main strategy, an integrated work including, in addition to community participation, the articulation of disciplines and institutions from different sectors [3]. One of the major challenges for Collective Health, and particularly for Environmental Health, is structuring monitoring systems that anticipate and, if possible, prevent the consequences of environmental changes for human health. This requires the systematic collection and analysis of data to allow the construction of indicators that point to this interrelationship and subsidize the planning of actions [4].

The Pan American Health Organization (PAHO) defines Primary Environmental Care (PEC) as a basically preventive and participatory environmental action strategy at the local level and recognizes the right of human beings to live in a healthy and adequate...
environment. It also advocates for the right to information regarding environmental risks related to health, well-being and survival, while defining the responsibilities and duties of Primary Care (PC) in relation to protection, conservation and recovery of the environment and health [5].

Primary Care is characterized as a set of health actions, in the individual and collective scope, which cover the promotion and protection of health, the prevention of aggravations and the development of bonds and accountability relations between the teams and the subject population, ensuring the continuity of health actions and the longitudinality of care [6]. Primary Care has Family Health Strategy (FHS) as the priority vector for its organization, according to the precepts of the Unified Health System (SUS) [7].

Community health workers (CHWs) have emerged in Collective Health within a context of social, ideological, political and technical accumulation and influences, involving national and international demands [8]. Community Health Workers have the duty of being the main link between Family Health Strategy and the community, allowing the bond with the family to be strengthened, allowing health actions to be brought closer to a household context, increasing the population’s ability to deal with the problems [9]. Family Health Strategy can be understood as a reorientation strategy of the care model, put in operation by implementing multidisciplinary teams in primary health centers [6,10]. In Family Health Strategy, teamwork is considered one of the pillars for the change of the current hegemonic model in health, with constant and intense interaction of workers of different categories and with diversity of knowledge and skills who interact with each other so that user care is the ethical-political imperative that organizes technical-scientific intervention [11].

The municipality of Sao Jose do Sul, in the state of Rio Grande do Sul, Brazil, is considered small size, with a population of 2,082 inhabitants [12]. It has a land area of 59.03 km², with a population density of 35.3 inhabitants per Km². According to the municipality’s Sanitation Plan [13], of these 2,082 inhabitants, 720 inhabitants (34.58%) lived in the urban area of the town and 1,362 inhabitants (65.42%) in the rural area.

The town has a health center where the Family Health Strategy has been in place since the year 2001, caring for approximately 729 families. The territory is divided into 8 micro areas, with the presence of 1 Community Health Worker per micro area.

This paper has as general purpose to describe the incorporation of Environmental Health through Primary Health Care, identifying how Primary Care can be involved in the prevention and control of local environmental problems.

The specific objectives are to make a situational environmental diagnosis of the municipality of Sao Jose do Sul/RS-Brazil, describe the process of promotion of Environmental Health in the Family Health Strategy in the town, and analyze the insertion of environmental workers (assignments) in Primary Environmental Care.

Materials and Methods

Research Approach

The study followed the hybrid approach. That kind of design allows the combination of a quantitative study with a qualitative approach. The combination of these procedures could lead the better access to the information and reality that this study was looking at.

Sample size and sampling strategy

The following groups composed the sample: - 02 city managers; Secretary of Health, Sanitation and Social Assistance and Secretary of Agriculture and Environment; - 12 health professionals of the Primary Health Center; 02 nurses, 02 doctors, 02 dentists, 05 nursing technicians and 01 oral health assistant; - The chief agronomist of the office of the Technical Assistance and Rural Extension Company (EMATER) in Sao Jose do Sul/RS-Brazil; - 31 members of the community of the municipality: 23 citizens and 8 Community Health Workers that are members of the community as well.

To access the members of the community, the Snowball technique was used [14]. Each Community Health Worker, previously trained, indicated three residents of their micro area of operation and applied the instrument. The non-probabilistic Snowball sampling is a method that does not use a system of references, but rather a network of relationships of the existing members in the sample. The process begins with a given number of selected people who are part of the target population. These people, in turn, are tasked with indicating other individuals for the sampling, giving the snowball effect. It continues until reaching the desired sample size, the “saturation point”, when the new informants start repeating the contents already obtained in previous questionnaires, without new relevant information [14,15].

Data collection instruments

A questionnaire and two semi-structured interview scripts were used as interrogation instruments. To the first specific objective, to make a situational environmental diagnosis of the municipality of Sao Jose do Sul/RS-Brazil, the questionnaire was applied. To the second and third specific objectives, to describe the process of promotion of Environmental Health in the Family Health Strategy in the town, and analyze the insertion of environmental workers (assignments) in Primary Environmental Care, interviews were conducted.

The questionnaire was developed by using the Quintieri script [16] as a reference, and the definition of urban and rural local environmental problems, under Primary Environmental Care, as defined by PAHO’s Division of Health and Environment [17]. This interrogation instrument was developed in order to be applied to Community Health Workers (8) and members of the community, so that each informant could express their opinion on the Environmental Health topic and how it is inserted in their activities and in their day-to-day lives. The questionnaire was applied to 31 informants.

The semi-structured interview scripts were prepared based on the model used by Valesque [18]. One of the semi-structured
Interview scripts was applied to the city managers: Secretary of Health, Sanitation and Social Assistance and Secretary of Agriculture and Environment. The second script was applied to health professionals of the Primary Health Center. The interview data were collected through audio recording, which were deleted after transcription.

The visit to the office of the Technical Assistance and Rural Extension Company (EMATER), in order to listen to the chief agronomist about points raised by the study, went on informally.

Validity and reliability issues

The interview scripts and the questionnaire were previously tested in order to evaluate whether the language was appropriate, as well as to estimate how long it would take. The pre-test took place in the municipality of Harmonia, state of Rio Grande do Sul, taking into account how dose it was to the study venue, as well as factors such as population, land area, culture and socioeconomic similarities.

Data analysis

The data obtained from the interviews were treated by the Content Analysis procedure. It is a communication analysis technique that explores what was said in the interviews, or observed by the researcher. Upon reviewing the material, it is sought to classify them in themes or categories that help to understand what is behind the speeches. A more careful procedure to identify key expressions representative of the perceptions reported in the responses [19,20]. The data obtained from the questionnaires were treated by quantitative approach.

Ethical considerations

In all situations, the Informed Consent Form (ICF) was presented, assuring respondents that they could withdraw their participation at any time. The research project was approved by the Research Ethics Committee (CEP) of Universidade Luterana do Brasil, under CAEE case number 54316816.9.0000.5349.

Results and Discussion

The environmental diagnosis of the municipality of Sao Jose do Sul/RS, Brazil

A total of 31 people took part in the application of the questionnaire, of which 24 were female and 7 were male, 18 in the age group from 16 to 38 years of age and 13 in the age group from 39 to 56 years of age. Table 1 shows the set of possible environmental problems, listed by Primary Environmental Care, presented by the questionnaire. Each respondent gave each problem stated a degree of impact among the three proposed by the scale of the instrument.

The five environmental problems that were highlighted as having a great impact, according to the residents, in decreasing order of relevance, were: use of pesticides, unauthorized burning (burning of waste), vectors, soil misuse and deforestation (Table 1).

The use of pesticides is a problem not only in the municipality but also in the entire Vale do Cai/RS region. A citrus growing region, where most farmers use various types of herbicides and pesticides in agricultural production. Often without a qualified professional to monitor their proper use. The lack of care with the health of farmers, who use no personal protective equipment, is noticeable. Residents claim that the use of masks and long-sleeved clothing would disrupt the application of pesticides on hot days.

Most studies on occupational health in agriculture and moderate pesticide exposure have found increased prevalence of neurologic symptoms and changes in neurobehavioral performance, reflecting cognitive and psychomotor dysfunction. Pesticide exposure may also be associated with increased risk of Parkinson disease [21].

Another problem, associated with the extensive use of pesticides in the region, is about washing containers. When the containers are not washed properly, the soil and, consequently, the water table may be contaminated. Certain difficulty is identified regarding reverse logistics of pesticides packaging. Because the packaging comes in the form of buckets, it is common to find these buckets being reused for both agricultural work and housework. The residents showed concern for a possible contamination of springs and streams. Besides mental disorders, pesticides cause several health problems: tumors, immune disorders, circulatory, respiratory and digestive diseases [22].

The Municipal Health Department of the town has no data on how many people use antidepressants. However, by informal survey conducted with clerks of the Primary Health Center pharmacy, we learned that about 20% of users, who demand pharmaceutical drugs, make use of them. In addition to depression, another problem associated with the use of pesticides is the cases of suicide, which occur in several municipalities of Vale do Cai/RS. There are no systematized data about it. The implementation of a notification system, investigating the causal link between the events, is suggested [23]. The study conducted by Faria, et al. [24] reinforces the hypothesis that pesticide use and pesticide poisoning increase the suicide rates. Parallel to the growing pesticides consumption worldwide, is the increasing concern about their effects on mental health.

As for the second environmental problem identified as

<table>
<thead>
<tr>
<th>Local environmental</th>
<th>Low impact</th>
<th>Medium impact</th>
<th>High impact</th>
<th>No response</th>
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</thead>
<tbody>
<tr>
<td>Air pollution</td>
<td>14</td>
<td>6</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Noise pollution</td>
<td>18</td>
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<td>1</td>
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<tr>
<td>Water pollution</td>
<td>9</td>
<td>10</td>
<td>8</td>
<td>4</td>
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<tr>
<td>Quality of drinking water</td>
<td>18</td>
<td>6</td>
<td>3</td>
<td>4</td>
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<tr>
<td>Waste Disposal</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>4</td>
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<tr>
<td>Misuse of soil</td>
<td>8</td>
<td>10</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Disease vectors</td>
<td>7</td>
<td>11</td>
<td>10</td>
<td>3</td>
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<tr>
<td>Unpaved streets</td>
<td>14</td>
<td>7</td>
<td>6</td>
<td>4</td>
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<tr>
<td>Unauthorized Incineration</td>
<td>9</td>
<td>7</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Lack of green areas</td>
<td>18</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Natural disasters</td>
<td>15</td>
<td>10</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Basic sanitation</td>
<td>9</td>
<td>11</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Use of agrotoxics</td>
<td>3</td>
<td>5</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>Soil erosion</td>
<td>12</td>
<td>8</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Deforestation</td>
<td>9</td>
<td>9</td>
<td>9</td>
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</table>

Table 1: Local environmental problems and number of residing respondents per assigned impact degree, Sao Jose do Sul/RS, Brazil.
having a relevant local impact, the unauthorized burning, the contradictions between responses given to different questions of the instrument caught our attention. The municipality is fully served by collection of solid waste, and residents reported that their waste is sent to that service. However, they noticed that some waste is being incinerated irregularly.

Vectors were considered the third problem with the greatest impact. The large number of mosquitoes, flies and black flies is a subject frequently brought up by the community to the Community Health Workers. In their responses, the residents claimed that animal husbandry is linked to such a proliferation, as well as accumulated waste, mainly along roadsides.

Poor handling and disposal of waste are major causes of environmental pollution, which creates breeding grounds for pathogenic organisms, and the spread of infectious diseases. This situation is associated with the presence of houseflies in the kitchen and correlated with the incidence of childhood diarrhea. There is an association between waste burning and the incidence of respiratory health symptoms [25].

Soil misuse was pointed out as the fourth environmental problem to which the municipality is exposed. For the agronomist of EMATER, in the view of the residents, soil misuse could be related to burying solid waste or disposing of swine manure in open soil, which happens because the swine farmers need to empty their manure pits. There is also the practice of planting eucalyptus in swamp areas to dry the land, which is another point that may have been considered in the assessment of this risk. Deforestation was considered fifth among the main environmental damages. In rural areas, deforestation occurs to expand the area of agricultural production. The main consequences include the lack of protection of springs, attack of wild animals to plantations and to domestic animals, unbalance in the temperature and cycles of rains.

On the other hand, those environmental problems which, although they also affect public health, are seen with less concern. The problems considered to have the least impact, in ascending order of importance, were: lack of green areas, quality of water supply, noise pollution, natural disasters and air pollution.

The absence of green areas was classified as the problem with the lowest environmental impact, among all those considered by the Primary Environmental Care and proposed by the instrument, which is therefore considered to be of little importance by the population. Sao Jose do Sul/RS has a public square with little physical space, little green area and the trees planted there are not yet in adulthood to generate shade. One can presume that one of the reasons why the community may not have placed green areas as an important item would be because there are green areas in the areas of agricultural production.

Next, the quality of the water supply is highlighted as a problem of lower concern. The municipality has artesian wells for supply. However, all wells should be protected by an enclosure, avoiding close circulation and the risks of adulteration of the chlorine dose or contamination, with damage to the health of the population.

Another problem faced by the municipality, in relation to water supply by artesian wells, refers to authorization. The wells are drilled in the properties; however, there is no record of how many they would be, mapping of who uses them and whether they have authorization. It is also unknown whether these wells had their water submitted to analysis to check whether they meet the drinking-water standards required by Ordinance No. 2914/2011 of the Ministry of Health [26]. As Heller [27] points out, water supply is understood as an action that, as a priority, seeks to protect human health. Therefore, wherever possible, the best practices in water supply should be highlighted, aiming at health protection, and non-recommended practices, which increase health risks, should be mentioned.

According to Wongsasuluk, et al. [28], people living in warmer climates are more susceptible to and at greater risk of groundwater contamination because of their increased daily drinking water intake. This may lead to an increased number of cases of non-carcinogenic and carcinogenic health defects among local people exposed to heavy metals by drinking the groundwater.

Noise pollution is also considered an environmental problem by the residents interviewed, but of less concern. In Sao Jose do Sul/RS, there is an industry of window frames and a slaughterhouse in the city center, which can interfere with the level of noise perceived by the population during their operation hours. In the rural area, there is the interference of agricultural machinery (tractors, chainsaws and grass grinders) and machinery to mow grass along roadsides.

As for natural disasters, due to its geographic location, located at the beginning of the Serra Gaucha (the Mountain Range area of the state of Rio Grande do Sul) and far from the Cai River, the city does not suffer from environmental problems such as floods and landslides. However, storms with hail, strong winds and droughts compromise the crop of residents who earn their living from agriculture. These incidents usually represent losses for the current and future crops.

As for air pollution, residents of some micro areas often complain about air quality because they live in areas with coal kilns. The coal kilns in the municipality have environmental licensing; however, depending on wind direction, the smoke ends up heading to residential areas, compromising air quality and bringing discomfort to those residing in the areas affected by the odor. About exposure to burning coal, according to Lockwood [29], we suffer a silent epidemic. Asthma, chronic obstructive pulmonary disease, lung cancer; heart attacks and strokes are clearly linked to coal-derived pollution.

An important topic was not mentioned by residents as a local environmental problem: sanitation. This finding is relevant because it is directly related to human and environmental health. According to Junia [30], a population without sanitation is ill, and is accompanied by problems such as diarrhea, cholera and hepatitis. Sanitation continues to receive attention internationally. In 2007, more than 11,300 readers of the British Medical Journal (BMJ) chose the introduction of drinking water and adequate sewage disposal - "the sanitation revolution" - as the most important medical and Public Health milestone since 1840, when the BMJ was published for the first time [31].

Environmental health promotion process in family health strategy

Through the interviews conducted with the professionals of
the Family Health Strategy, we obtained their understanding of expressions such as Environmental Health and Health Promotion, local environmental problems that they recognize, and the ways how Environmental Health is articulated with Primary Care in the municipality of São José do Sul/RS.

We noticed that during the application of the interviews, the question “What is your understanding of Environmental Health?” was asked on several occasions to be answered at the end, because they needed more time to think about their answer. With this frequent behavior, it can be inferred that this subject is not common in the routine and thoughts of health professionals.

In summary, they defined Environmental Health as:

Environmental Health is everything that is around someone, that is environmental sanitation, cleanliness, prevention of environmental problems that can affect the health of man in the environment.

For the question about their understanding of what the health promotion field activities comprise, many answered by associating it with the notion of health prevention. Actions focused on the specific control of diseases, reflecting a medical-curative idea. The answers to this question, given by the nursing technicians, accentuate this view by expressing the individualistic nature of the actions and initiatives, implying that the patients alone are responsible for taking care of their own health. An attitude that shows the absence of the idea that problems of collective health demand solutions that is also collective in their nature. This is perceived in several speeches:

(….) Promoting health, for me, is when people take care of themselves, and that is very important, but above all, it is about maintaining a healthy environment. Healthy eating is also important (…) .

I think that… it is more about prevention and avoiding the development of diseases (…).

I think it is about the well being of patients, of people, it is about caring, and getting them to worry about their health every day, like… It is, how can I say that, about getting them to develop healthy habits of life, quality of life, physical exercise, food, so that their life can continue in a situation of stability.

Findings that still confirm a study by Ianni & Quiterio [32], showing that the concept of health promotion that appears more immediately in Primary Care reflects only the idea of a kind of “expanded prevention”. It adds up to the perception that intersectoral action, which is the cornerstone of promotion, depends on a certain level of communication and information from the different sectors, to which they often do not have access.

On the other hand, doctors and nurses have an understanding that promoting health does not fall only on individuals, but rather it depends on other factors, such as Primary Care involvement and external factors such as the environment where they live.

That can be seen in the three answers below:

The understanding of health promotion is very broad. That is everything that we do to favor a healthy lifestyle, to avoid disease transmitting agents or pollutants, or anything that may affect human health.

(….) It is about those activities that we do to promote, as we say, health actions to avoid getting sick. It is about those preventive activities that we do to avoid anything.

Health promotion means to identify health risk factors, the well being of human beings, and to seek quality of life.

With regard to the connection of Environmental Health with Primary Care, there were very vague answers, such as: “Yes, a lot” and “I think so”. Unconvincing answers, conveying the idea that little thought was given to that, and consequently without understanding more objectively what Environmental Health is about and how it interferes with human health.

On the other hand, when the respondents were asked about the Primary Care’s role in addressing environmental issues, they brought fundamental concepts such as: working together, being approachable and working with other sectors of the municipality. The speech that best represented the ideas of the respondents was:

It is about always walking together, especially because when the environment has any problem that will also cause health problems. So if it is not walking together with the Environment Department, together with the Health Department, in some issues the population will also soon become sick.

We noticed that, for some of the professionals interviewed, in order to have a healthy population and quality of life, it is important to take into account the environmental conditions where they live, because that ends up affecting the life and health of Primary Health Center users.

Regarding the articulation of Primary Care with Environmental Health, again, the respondents had doubts: (1) whether or not it would happen in the municipality of São José do Sul/RS; (2) if that happened, in what way that articulation would take place in the municipality. However, they proposed initiatives such as: “I think that should happen in the meeting of the secretaries, because that is the time to discuss what really happens in the town.” Another respondent, in his testimony, highlights aspects discussed here previously, articulating in his answer some of the questions proposed to him throughout the interview:

This articulation, in practice, does not occur, because Primary Care still remains very individualistic, that the collective part is not thought about, and that not enough space is available for this type of discussion.

Regarding the environmental problems faced by the municipality, the findings show that the health professionals’ view is different from that reported by the residents. Residents identified the use of pesticides as a major environmental problem faced by the municipality. On the other hand, that problem was hardly remembered by Primary Health Center professionals. Those professionals pointed out the lack of sanitation faced by the municipality, which only has a cesspool-filter-sink system, required for homes built since 2006, according to CONSEMA resolution 128/2006 [33].

Several of them reported the presence of sewage in ditches, which would help in the proliferation of vectors, especially mosquitoes such as aedes aegypti, responsible for diseases such as dengue, zika virus and chikungunya. Some also expressed
concern about animal waste, especially that coming from swine and poultry farming activities. Another problem identified was hazardous household waste, which is not collected by the company contracted to provide urban waste collection services, such as light bulbs, tires, televisions and other electronics that should receive the application of reverse logistics, according to Law 12305/2010 [34].

It appears that the Primary Care of Sao Jose RS does not invest in training in environmental issues. Of the eleven (11) respondents, only one took part in any course or training related to the environment. That could be the reason for the respondents’ difficulty in perceiving the role of Primary Care in the quality of the environment and how that interferes with the health of the population served. In the speech of a professional who has some training in this area, we see the importance of having such knowledge:

Yes, I have taken courses on Environmental Neurotoxicology, work-related diseases, and that is why I talk about pesticides, because they cause many diseases that people do not even know about, even depression is related to the use of pesticides, back pain, sciatic pain, numbness of the extremities, and people do not associate that with pesticides. They think that only acute exposure causes problems when in fact chronic, slow, repeated use will also slowly damage the body.

This evidence shows the role that knowledge can have when applied to conducting diagnostics during consultations, exploring causal links between complaints presented and local and occupational environmental conditions.

Involvement of environmental professionals in primary environmental health care

Regarding the importance of a professional of the environmental area acting in Primary Care, the respondents said that “Yes, that would be necessary”. They recognize the municipality’s need to have a professional like that joining the team, but they failed to mention the responsibilities or to characterize the role of such a professional. In one of the speeches, they question about the cost of maintaining such a professional, given that Sao Jose do Sul/RS is a small town. However, the municipalities of the region make up the Intermunicipal Consortium of Vale do Rio Cai (CIS/CAI), which includes 27 municipalities. Intermunicipal consortia constitute an autonomous initiative of municipalities that are associated to manage and provide specialized services, and to support diagnoses of greater technological density for the population of the participating municipalities, jointly [35].

The city managers expressed an urgency to have a professional in the environmental area, because currently the person in charge of meeting the environmental needs of the municipality is linked only to the Environment Department and does his work only in one shift and once a week. The Health Department does not have any professional in this area and, according to the Secretary’s statement, in her interview, “There could be a professional with qualification and training in environmental engineering to join the team”. The actions of environmental health surveillance are developed, as reported in an interview, in activities carried out at schools and through Community Health Workers, who promote health-related issues.

With the interviews, it appears that the Agriculture and Environment Department has no link and integration with the Health, Sanitation and Social Assistance Department of Sao Jose do Sul/RS. The manager had difficulty responding to the interview, even stating that these issues were not related to his department. It is clear that the managers do not have a common understanding as to how the articulation of the management of Primary Care with the management in Environmental Health could take place. Each manager answered very differently, implying that there is no communication between these sectors on the subject.

In spite of the fact that the Primary Care has people who do not have an understanding of the role and duties of an environmental worker, for example an environmental engineer, with the Family Health Strategy, such a professional can work, gradually opening and configuring a field of action in three dimensions: background scenario, strategic environmental assessment and actions.

First dimension of action plan: background scenario:

The field of Environmental Health involves two imperatives: multidisciplinary and intersectoral. The multidisciplinary imperative entails working the issue with health professionals, helping them to analyze environmental conditions and establishing causal links with illness and death events. The intersectoral imperative entails having transit among all the municipal sectors, for diffusion of the subject and articulation of joint actions. In order to meet these requirements, the environmental professional is proposed a starting point for this journey, combining the findings of this paper and the contributions of the Mapping Health Toolkit [36]:

- Assist in the understanding of the nature and of the environmental determinants that lead to the results found, in the municipality, in terms of Public Health and inequalities;
- Assist in identifying priorities in Environmental Health for their local area;
- Development of a Public Health profile to map a series of health outcomes, and the underlying causes of health problems and inequalities, within their area of action, linked to environmental conditions;
- Support actions and partnerships in the provision of services with other sectors of municipal administration and private sector;
- Offer an appreciation and knowledge of the resources and tools of Environment Mental Health that are available to work;
- Contribute to improving strategic decision-making and learning policy, related to Environmental Health, within governmental and non-governmental organizations.

Second dimension of action plan: strategic environmental assessment:

Strategic Environmental Assessment (SEA) means making periodic situational environmental diagnoses, with special attention to the environmental determinants of the health conditions of the local population and the causal links between environmental conditions and health problems suffered by the population. For that, they would rely on the following resources and procedures: routine visits of the Community Health Workers,
training them and monitoring them in their day-to-day activities, stimulating them so that when they notice any environmental damage in the community, they may take this information to the Health Department so that, together with the environmental engineer and other sectors involved, preventive and mitigating actions may be determined and taken; periodic attention to the town’s health center reports on care given; and work out with the community, through group discussions, the adverse health effects that environmental problems can cause.

**Third dimension of action plan: actions:** As a result of the situational environmental diagnosis carried out with the municipality of Sao Jose do Sul/RS, Brazil, a summary table is proposed with the actions that could be implemented by such a professional (Table 2).

The results obtained in the interviews and in the questionnaires show that it is important to have an environmental professional so that such a professional may have a role in the Primary Care within the Family Health Strategy. That professional takes a critical look at the environmental problems that occur in the municipality and region and at how they may interfere with the health of the community. For such an insertion to produce results, the local population and all sectors of the municipal government, such as the Department of Health, Sanitation and Social Assistance, the Department of Agriculture and Environment, the Department of Education, EMATER, Reference Center for Social Assistance (CRAS), among others, must engage in the work to address local environmental problems, bringing their suggestions, doubts and ideas.

**Conclusion and Recommendations**

The case study was initiated through the application of the questionnaires and interviews, both approved by the Research Ethics Committee (CEP) of this University, to the community and to the members of interest of Sao Jose do Sul/RS. Through the answers obtained, it was possible to characterize an environmental diagnosis for this municipality.

The environmental characterization diagnosed that the municipality suffers from problems related to rural practices, such as the use of pesticides, unauthorized burning, vectors and deforestation. And more urban problems such as the lack of sanitation, where the main problem is the open sewers and households that do not yet have a filter cesspit, favoring the appearance of vectors.

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<tr>
<th>Environmental Problem</th>
<th>Interventions of the Environmental Professional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water supply by artesian wells (individual)</td>
<td>Carry out a survey and recording of the number of wells that are in use, the mapping of who uses them, whether they have authorization and whether they would be meeting the drinking-water standards</td>
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<tr>
<td>Water supply by artesian wells (municipality ward)</td>
<td>Arrange for enclosure and monitoring of the maintenance of these wells</td>
</tr>
<tr>
<td>Qualification of Community Health Workers in Environmental Health</td>
<td>Train the Community Health Workers on Environmental Health to better identify the environmental problems faced in the micro areas where they reside and how this interferes with the health of local residents</td>
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<tr>
<td>Collection and segregation of household solid waste (Burning waste)</td>
<td>Work with residents on the correct segregation of waste and the risks that burning brings to human health and the environment</td>
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<tr>
<td>Packaging of pesticides</td>
<td>Implement a reverse logistics program</td>
</tr>
<tr>
<td>Pharmaceutical drugs in disuse</td>
<td>There is no habit in place for returning these products to the Primary Health Center or for delivering them to Community Health Workers, so that they can be properly discarded. Residents throw the pharmaceuticals into the toilet, residential waste or they bury them, with no concern for the effects they can have on the environment and health. The Guide to the population on the correct disposal of obsolete or expired pharmaceutical drugs and how incorrect disposal can compromise environmental and human health</td>
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<tr>
<td>Improved Sanitation Facilities (ISF) program accompanied by Municipal Sanitation Workshops (MSW)</td>
<td>Make use of the program promoted by FUNASA, for small municipalities, mainly in its rural areas, for the implementation of filter cesspit in all households. And through the Municipal Sanitation Workshops hear from the community ideas and proposals to improve sanitation</td>
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<tr>
<td>Noise Pollution</td>
<td>Make noise level measurements (by using a decibel meter) in industries and stores in the town center, looking to check whether they are within the standards established by law</td>
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<tr>
<td>Olfactory Pollution</td>
<td>Promote actions jointly with swine farmers and with those responsible for the slaughterhouse, to seek odor reduction measures</td>
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<tr>
<td>Waste and Vectors: dissemination of neglected tropical diseases</td>
<td>Develop educational material for distribution and discuss this issue at schools, guiding children and the general population about the relation of incorrect waste disposal and how this interferes with the health of the community through the proliferation of vectors</td>
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<tr>
<td>Organic waste</td>
<td>Composter: carry out joint actions between the schools and the Reference Center for Social Assistance (CRAS) to generate organic fertilizer by using composters Fertilizer that can be used in community vegetable gardens, avoiding the use of pesticides and engaging the population in thinking about the importance of making the correct segregation of organic waste</td>
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<tr>
<td>Sanitation</td>
<td>Propose compact household wastewater treatment plants to treat sewage generated by the urban population</td>
</tr>
<tr>
<td>Pig Farming</td>
<td>Train Community Health Workers to properly advise and guide residents who release swine waste into unsuitable places. That is an activity of great pollution potential, due to the high number of contaminants generated by its wastewaters, and that can represent an important source of degradation of air, water resources and soil (37). The biological degradation of the waste produces toxic gases whose exposure to high levels can reduce the zootechnical performance of the pigs and make handlers incapacitated to work</td>
</tr>
<tr>
<td>Use of pesticides</td>
<td>Help the team to approach the effects of pesticides on the environment and health with the community: the effects usually appear over the years and the symptoms may not be associated with their use. Associate with diseases caused in those who apply or consume products that had direct or indirect application</td>
</tr>
</tbody>
</table>

**Table 2:** Environmental Health and a professional of the environmental area: actions to be implemented in the municipality of Sao José do Sul/RS, Brazil.
The data resulting from this research demonstrated the importance of having an Environment professional inserted in the actions of Primary Care. The environmental vision is not yet included in the daily life of these professionals, whose main consequence would be not realizing that the demand of users who seek care in the Primary Health Center can be related to environmental determinants. The environmental engineer would be responsible for, among other duties, advising the teams in the understanding of the nature and the environmental determinants that lead to the results found and offering the Environmental Health resources and tools that are available.

Such a professional would be important not only to act in the Primary Care, but also to work together with the other municipal departments, in an intersectoral perspective. For municipalities with a smaller population, the viability of investing in this type of professional could take place through Inter-municipal Consortia.

This paper lists a series of actions that could be taken together with an Environmental Engineering professional, aiming to address local environmental issues, such as: training Community Health Workers on the issue, use of pesticides, pig farming, sanitation, improved sanitation facilities (ISF) and municipal health workshops (MHW), organic waste and supply by artisan wells.

Finally, the study shows the lack of knowledge about Primary Environmental Care, its strategies and the role of environmental professionals in the Family Health Strategy. A context that contributes to the lack of collective work among the different municipal departments in the promotion of Environmental Health. Thus, the development of training actions within Municipal Health and Environment Councils and other instances of social control is necessary.

**Authors’ Contributions**

Furh was responsible for project design, data collection, data analysis and paper writing. Chaves guided all the steps of the work and participated in the review and writing of the project and of the paper. Hallam and Bender participated in the review and writing of the paper.

**References**


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