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Youngsters and children and water supply in Guaratinguetá, Lorena, and Potim (SP, Brazil): perceptions, knowledge, and sources of information

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1. Introduction and objective

This work is a research excerpt with focus on putting together a base line regarding the experience and the knowledge the young inhabitants from Vale do Paraíba's and North Coast's Metropolitan Region (RMVPLN) have (São Paulo, Brazil). Putting this base line together serves to contribute with sustainability education improvement: getting acquainted with solid experiences from young people and children is essential to strengthen their conditions of getting involved in decisions regarding production, use, and governance of nexus components (REDMAN; REDMAN, 2014).

This study has examined the perceptions of young people and children between 10 and 24 years old regarding one of the nexus' elements - water supply - in three municipalities within the RMVPLN: Guaratinguetá, Lorena, and Potim (CLARK *et al.*, PACINI-KETCHABAW; CLARK, 2016).

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2. Methods

The data are results from a survey-type research, with the application of an extensive data collection instrument with social stratification of gender, age, educational background, dwelling, and school type. Questionnaire responses were provided through a form (online or hardcopy), in schools and workplaces. The sample consisted of 669 interviews. The data were treated using established statistical tools. The Sphinx iQ2 software was used to set up the questionnaire and its database with all records, and also for all data treatment.

3. Results

3.1. Characterization of municipalities and of water supply

The population of Guaratinguetá is estimated in 117,777 people, with a 95%-urbanization level. In 2014, it was part of Group 2, formed by small cities from the state of São Paulo, in which all presented similar income, educational background, and health conditions indexes (IPRS). Group 2 encompasses the municipalities that, despite their high wealth levels, do not present good social indicators. The population of Lorena is estimated in 85,839 people, with a 97%-urbanization level. In 2014, it was part of Group 5 according to IPRS, which consists of the most disadvantaged cities, both regarding wealth and social indicators. Potim has an estimated population of 20,434 people, with a 76%-urbanization level. In 2014, it was also part of Group 5 according to IPRS (SEADE, 2018).

The three contiguous cities maintain distinct supply systems in terms of governance. In Guaratinguetá, water supply is under the responsibility of the municipal company *Companhia de Serviços de Água, Esgoto e Resíduos de Guaratinguetá - SAEG* (Water, Sewage and Waste Services Company of Guaratinguetá), which serves 100% of the urban area and some surrounding rural agglomerations. The supply consists of a main system and 12 other isolated systems. The main systems account for superficial collection from two creeks, with full water treatment for one of them and only disinfection and fluoridation for the other. The isolated systems use wells, with disinfection and fluoridation of the collected water. In Lorena, the water supply is under SABESP's responsibility (Company of Basic Sanitation of the State of São Paulo), a state open-stock private-public company. It covers for 99.8% of the urban area divided into four regions according to supply origin, based on underwater collection, which goes through disinfection and fluoridation. In both cities, the collected water is pumped to reservoirs, from which the distribution occurs using gravity, with conveyance stations, when needed. Measuring occurs in each of the consumption spots and permanent monitoring of water

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quality parameters, as well as disclosure of such information (AMPLA, 2016; SABESP, 2018; SAEG, 2016).

In Potim's case, water supply is under municipal government responsibility. The service covers for 85% of the urban area and it is based on underwater collection, after which it goes through disinfection and fluoridation, pumping to reservoirs and conveyance distribution. There is no guarantee regarding supply regularity, maintenance of the adequate network pressure or the meeting of potability standards. There is no measurement on consumption spots (PLASAN, 2010).

3.2. Characterization of respondents

The sample consisted of 669 interviews with children and youngsters from the three municipalities; 501 from Guaratinguetá, 86 from Potim, and 82 from Lorena. The mean age was 16, with standard deviation of 4 years. The relative frequencies in the age ranges were: 39% between 10 and 14; 28% between 15 and 18; 33% between 19 and 24.

3.3. Perception of young people and children regarding water supplying problems

One of the questions the respondents were asked was regarding the existence of problems in their neighbourhoods. One out of four respondents reported perceiving problems. However, this perception is not uniform among the cities, as shown in Figure 1. By using a contingency table, it may be concluded that there is strong dependency. (The test variable $X^2 = 90.45$, with 2 degrees of freedom, showed p=0.000)

The main dependency occurs in the perception of the respondents from Potim: 65% identified problems, whereas in the other 2 cities, these proportions were much lower.

The indicated problems are summarized in Chart 1. In the cases of Guaratinguetá and Lorena, only 10.41% and 3.5% of the respondents pointed out problems, respectively. In contrast, in Potim, around 66% of respondents pointed out problems, indicating supply interruption, water with inadequate treatment and of bad taste or smell.

Other differences were also identified among the cities:

- The frequency of conversations regarding water use at homes is sensitively larger in Potim (independence test, 10 gl, p=0.020).
- The exposed concern regarding the reduction of water consumption is slightly greater in Potim (p=0.026).
- The young people in Potim seem to be more sensitive towards waste in their environment (p=0.16).

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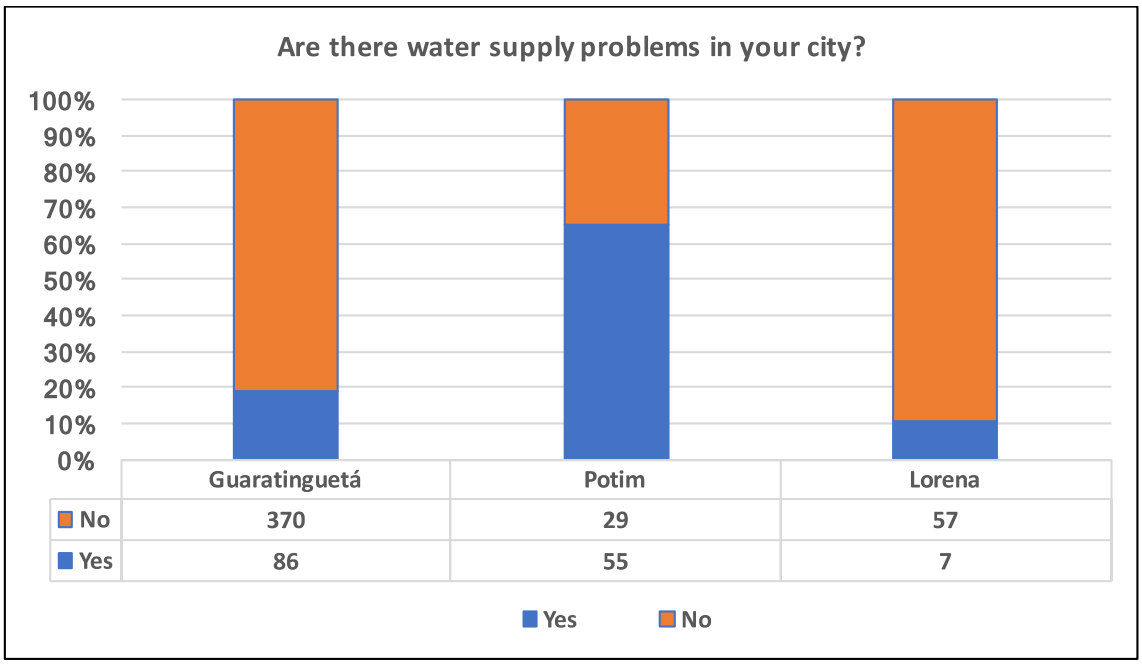
Figure 1 - Perception of problems



Source: the authors

Chart 1 - Pointed-out problems

Pointed-out problems	**Guaratinguetá**	**Lorena**	**Potim**
Insufficient treatment	0.8%.		
lack of water or supply interruption	6.8%.		18.3%.
dirty water on tap	2.2%.		
excessive chlorine	0.2%.		2.4%.
inadequate colour	0.2%.		
low pressure	0.2%.		
lack of piping or broken pipes		3.5%.	
water not potable / bad / untreated			19.5%.
bad water taste and/or bad water smell			20.7%.
water with the presence of bugs, larvae, or dirt			4.9%.

Source: the authors

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3.4. Perceived knowledge regarding water supply

This study also looked into identifying the knowledge level of children and youngsters concerning specific questions regarding water supply.

In reference to the knowledge concerning ***problems resulting from the lack of water***, the answer "I understand it very well" was chosen by 33% of the respondents; "I understand it well or enough" was chosen by 35%; "I have little understanding" was chosen by 24%; "I know nothing about it", 6%; and less than 3% chose "I am not interested". The test of independence did not identify significant statistical difference among the cities (8 gl, p=0.62).

Regarding ***diseases transmitted through the water***, the respondents seemed to have similar knowledge, with no significant difference among the cities (p=0.32).

Regarding the knowledge concerning the ***origin of water***, the data were also similar among the cities, with no significant statistical differences among the locations (p=0.35).

Regarding the knowledge concerning the ***water treatment and distribution process***, there was great variation among the cities. When the answers percentages of "I have little understanding" and "I know nothing about it" were summed, they represented 63% of all answers, them being 49% from Guaratinguetá and 35% from Lorena. The knowledge level regarding the process is perceived as significantly lower in Potim (test of independence, with 8 gl, p<0.01).

Also, there is much difference regarding the knowledge concerning ***what authorities and entities are responsible for water supply*** (test of independence, p=0.006, 8 gl). When the options "I understand it very well" and "I understand it well or enough" are added to the summon, only 16% of the answers come from Potim, whereas in Guaratinguetá and Lorena they represent 27% and 25%, respectively. In short: all proportions are low, but in Potim, this proportion is even lower.

3.5. Regarding means for knowledge acquisition

This study aimed at identifying the means through which young people access information regarding water supply. They indicated the sources of information they consider important for several themes. Figure 2 shows the score attributed to each source of information according to the 5 water supply-related themes.

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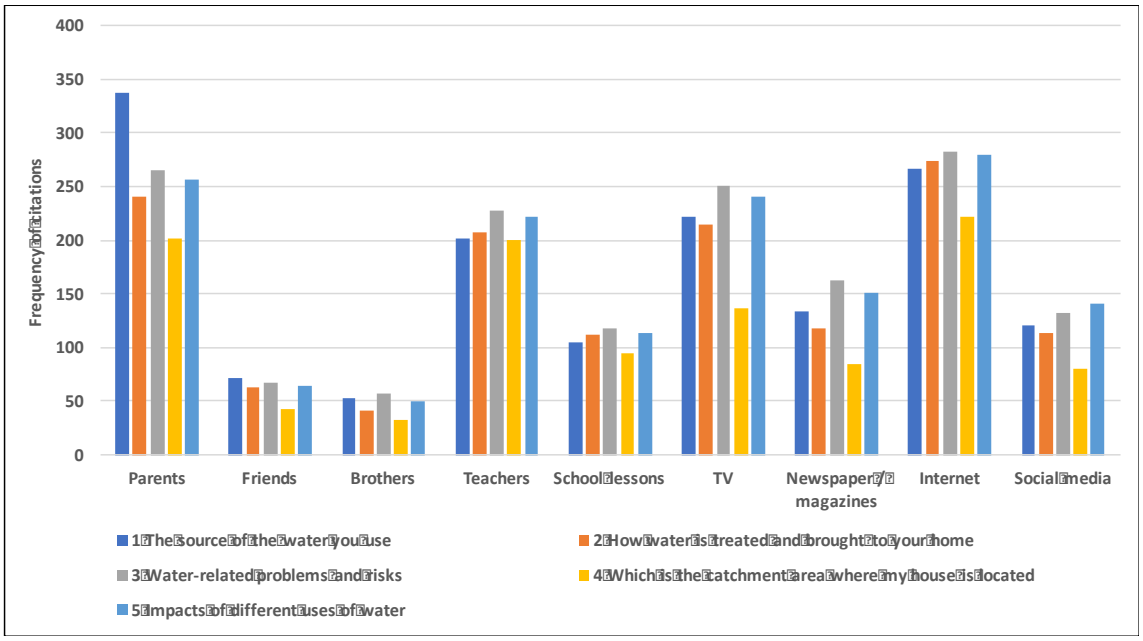
Figure 2 - Relative importance (in mentions) of the sources of information per theme.



Source: the authors

It is noticeable that the main source of information is the school when the number of incidences for “teachers” and “homework” are added up. However, isolatedly, the internet and the parents dispute importance priority. To evaluate if there are differences in ranking among the five themes, the statistical technique of the rank correlation analysis was applied. The lowest measurement value of rank correlation (Spearman’s rank correlation coefficient, which varies from -1 to +1) was 0.925, that is, there are no significant variations of source importance involving the five themes.

The Spearman’s rank correlation coefficients among the cities presented similar results. Even for the lowest coefficient value (0.72 between Potim and Lorena), there is good correlation (p=0.002). Figure 3 shows the ranking concerning means of information according to the cities.

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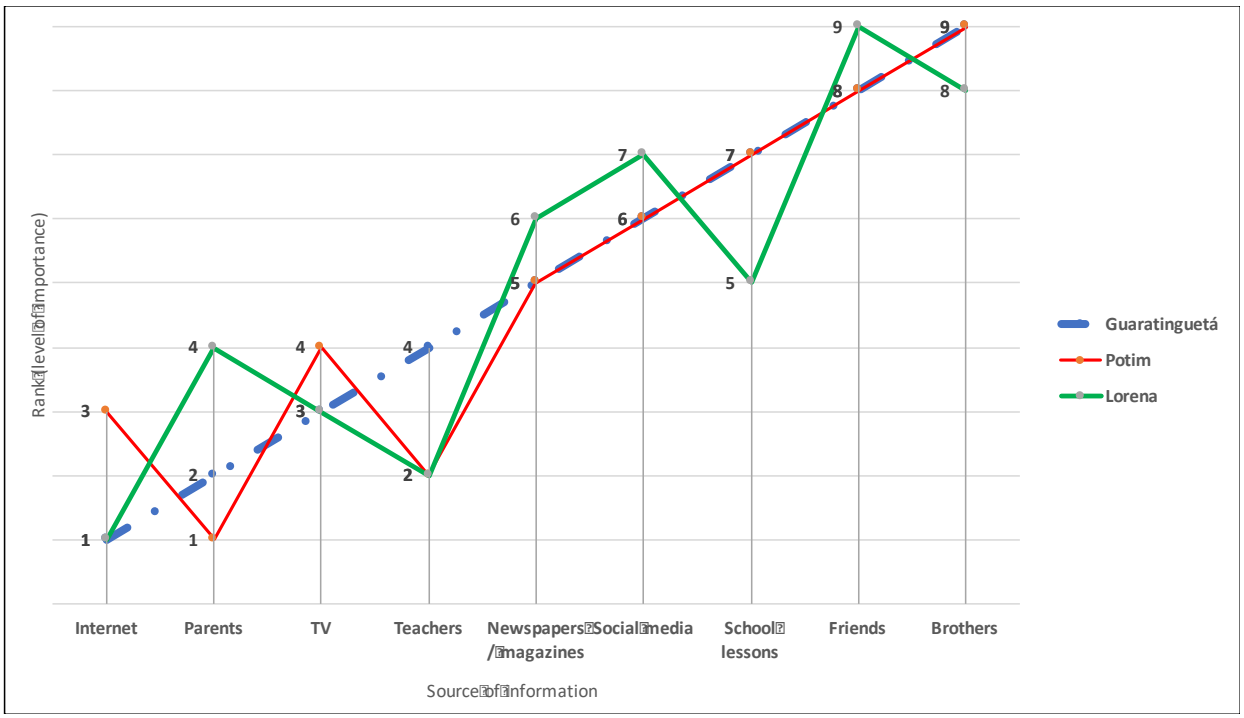
Figure 3 - Relative importance (in mentions) of the sources of information (in ranks), per theme.



Source: the authors

4. Conclusions

It is noticeable that children and young people of Potim feel the critical situation of water supply. They indicate the serious problems regarding the quality of the supplied water. More than in other cities, the declare having scarce knowledge regarding the water treatment process and about the authorities and entities in charge of supply. Comparatively, more responders from this city showed worry as far as consumption reduction and water waste were concerned. Their concerns regarding supply may be possibly directed to the search for solutions within municipality scope.

There are no large variations in the sources of information and knowledge either between the cities or between the specific themes. The youngsters access information through multiple and varied sources. This emphasizes the relevance that the deepening in the discussion regarding education for sustainability and the responsibility of the several actors involved in this theme may have.

One question is still left for discussion: what is the mission of authorities and entities in charge of water supply after all? Such mission should not be limited to water

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quality's availability and assurance. Even when this does not occur, the mission should be the promotion of responsible citizenship. How can this be accomplished? By qualifying users' perceptions... By promoting people knowledge acquisition... By informing people and institutions who educate our youngsters. To accomplish these, one must first listen, be attentive, give people their say...

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