

ORIGINAL ARTICLE

Impact of the educational program “Igiene Insieme” in 1,991 Italian primary schools: student behavior and incidence of SARS-CoV-2

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Abstract. *Objective:* To evaluate the impact of the health educational program “Igiene Insieme 2021/2022” on Italian primary school children’s knowledge, attitudes and practice of hygiene and sanitation and to compare incidence of SARS-CoV-2 in schools participating the project with regional data of Lombardy and Apulia. *Methods:* Participating schools were provided with a hygiene kit containing educational material for teachers and sanitizing products for students. We conducted a pre-post evaluation administering a questionnaire before and after the intervention. In addition, we compared SARS-CoV-2 incidence of the participating primary schools (225 in Lombardy and 120 in Apulia) to regional-level data. We tested the differences between groups by using the Chi-squared test. *Results:* Of 1,991 schools, 472 responded to both questionnaires for a total of 16,988 students. 17.3% of the students learned the importance of handwashing in preventing infections, 22.6% when to wash hands, 18.5% the existence of alternative solutions in absence of soap and water, 23.2% how to correctly wash hands. A lower incidence of SARS-CoV-2 infections was recorded in primary schools participating in the project as compared to the average regional incidence in Lombardy (9.6% vs.14.8%) and Apulia (10.7% vs.12.0%) for the same age group. *Conclusions:* We report an overall positive effect of health education interventions in primary schools. Although the limitations in the study design, our findings are important to inform planning, implementation and monitoring of health promotion campaigns in young generations so as to contribute to limit the risk of infection spread at the community level (www.actabiomedica.it).

Key words: School, COVID-19, hand-hygiene, health education, SARS-CoV-2 incidence, prevention, school education programme, infection prevention

Introduction

Hand hygiene is generally considered as the most important preventive measure to reduce the spread of infectious diseases (1) and the literature is full of publications that have investigated various facets of hand hygiene, especially in the health care sector (2,3). Over

150 years ago, Ignaz Semmelweiss first demonstrated the effectiveness of a seemingly simple intervention, hand washing, in preventing obstetrical nosocomial infections (4) and, since then, hand washing with soap and water (HWWS) at key times is heralded as one of the most cost-effective measures to reduce the global burden of gastrointestinal and respiratory diseases (5).

Hand washing with soap was listed as one of three key behaviors in the Global Water Supply and Sanitation Assessment 2000 report (6) by WHO that are of greatest likely benefit to health, particularly in developing countries. During the COVID-19 outbreak, there was a renewed emphasis on good hygiene practices, specifically hand washing with soap, for protecting against this infection and breaking the chain of transmission. However, the compliance with health and hygiene standards is fundamental not only in the health care setting but also in the general population, especially for situations in which there is a high probability of pathogens' transmission or ingestion, such as food preparation or use of sanitary facilities.

Primary school children are in a setting where basic life and behavioral skills are developing (7) and different studies showed that health behavior-forming programs in the school setting have a significant impact on their future life. Health and prevention programs can be particularly promising if integrated into the education system at an early stage (7-9). Some countries (USA, Germany, Denmark, Italy) have introduced various health programs in primary school, targeting hand hygiene interventions (10,11) in order to reduce the pathogens' transmission chain; some studies have shown that children often suffer from acute illness (such as cold and flu-like infections) and gastrointestinal infections during their childhood, directly linked to seasonal influenza, with loss of school days (and also work absenteeism for parents who have to take care of them) and impairment of proper learning process (10,11). Actually, there are few studies investigating the knowledge of primary school children about infectious disease, pathogen transmission pathways and importance on respective prevention measures and few data sets available on the hand hygiene school children at this level (10,12). Related studies are often pilot studies that include hand hygiene in the context of absenteeism from school and interventions to improve hand hygiene, focusing on proper handwashing (13-16). Given the lack of robust studies, more detailed research data on hand hygiene in school-aged children is needed.

Thus, in this research, a written questionnaire was developed and implemented in primary schools participating the "Igiene Insieme" project.

The aim of the study is: i) to evaluate possible changes in the behavior and knowledge of students with reference to the topics of daily hygiene and ii) to evaluate possible changes in the number of COVID-19 infections in the school classes that were enrolled in the "Igiene Insieme" project.

Methods

The "Igiene Insieme" project (2021/2022)

The study is part of the "Igiene Insieme" (Hygiene Together) project, a national level health educational program, promoted by Napisan (part of Reckitt Italia) in collaboration with "La Fabbrica", a communication agency with expertise in educational projects.

After the positive results obtained a previous similar programme (2020-2021) (17), the project has been extended to the school year 2021-2022 and it was dedicated to pupils, parents and educators to improve correct hygiene practices into the school context.

In the current paper, we analyzed the impact of the project by evaluating only the Italian primary schools that have participated the "Igiene Insieme" program for the first time, in order to have more realistic data of the project's impact.

The study was divided into two research sub-studies (sections):

- section 1, to detect any change in student's behavior by administering to the teachers participating in the project two short questionnaires (Q1 pre and Q2 post) containing the same questions;
- section 2, given only to schools located in two large regions (Lombardy and Apulia (identified as sample regions), to detect any change in data relating to SARS-CoV-2 infections, provided by the headmaster (or the COVID-19 contact teacher).

Data were collected through an on-line questionnaire and processed anonymously and in aggregate form. Teachers were asked to answer the questionnaire before receiving the kit and after one month of use, no

later than the end of February. The “Igiene Insieme” kit contained educational materials, validated by experts, and sanitizing products. An additional questionnaire was given to primary school teachers in Lombardy and Apulia regions for the second part of the study. Data collections refer to the period from mid-October 2021 to February 2022 and were compared with the regional data collected for the same period.

The Lombardy regional data relating to SARS-CoV-2 infections were provided by U.O. Prevenzione – Regione Lombardia while the Apulian regional data were provided by AReSS (Agenzia Regionale Strategica per la Salute e il Sociale) Puglia.

The first part of the study (section 1) was conducted through a survey: an online 12-items questionnaire, written in Italian, was provided to all the teachers of participating schools via link (<https://fabsurvey.survey.fm/igipre>) and each teacher was asked to answer all the questions. Questions 1 to 5 aim to contextualize each school (region, province, class and number of students) and teachers' initial knowledge of the nudged approach (used by the “Igiene Insieme” program to develop virtuous hygiene behaviors in pupils). Questions 6 to 9 aim to investigate students' knowledge of hygiene while questions 10 and 11 investigate students' behaviors of daily hygiene practices, based on teachers' observations. The last two questions (12 and 12b) aim to know the number of students in the class with complex communication needs and their level of knowledge of how to wash their hands correctly (based on teachers' observation).

Teachers were asked to answer the questionnaire Q1 before starting the project with their classes (in any case no later than January 30th, 2022) and questionnaire Q2 after a month of use of the kit provided (and in any case no later than February 28th, 2022). The supplied kit contained informative and didactic material about hygiene and products for cleaning hands and surfaces.

The survey referred to all Italian schools and data collected were processed anonymously and in aggregate mode. The measurement approach was based on children's current hand washing practice, children's game and quiz performance, teachers' observation of students' handwashing behaviors at group handwashing stations.

For the second part of the study (section 2), we did a quantitative analysis through an additional form called “Hygiene and COVID-19 in schools' context”. The survey was conducted exclusively in primary schools located in the two selected regions, Lombardy and Apulia, by sending an additional online form to be filled in. The data collection, in anonymous and aggregate form, refers to the period from mid-October 2021 to February 2022 and has been compared with the regional data collected for the same period.

The additional questionnaire aimed to investigate region, province, starting month of use of the “Igiene Insieme” educational kit, number of students, number of classes, how many cases of SARS-CoV-2 infections occurred in the school context (divided per months: November, December, January, February). For the quantitative analysis, we chose to consider the data relating to the month of January 2022 (from 03 to 30 January 2022).

Thanks to the answers to the additional form given to the Lombard and Apulian schools, we obtained the COVID-19 data relating to the schools participating in the project and we were able to compare the incidence of the infection in the respective regions. We tested the differences between groups by using the Chi-squared test. P-values lower than 0.05 were considered statistically significant. The statistical analysis was performed using the R Studio software (version 4.2.2).

Results

Section 1

Participants

The project “Igiene Insieme 2021/2022” involved 1,991 primary schools to which the “Igiene Insieme” kit was provided. Of the 1,991-school involved, 472 have answered the survey (both pre and post questionnaire). 520 primary schools' teachers answered both questionnaires out of total of 5,973 teachers involved. 16,988 students were monitored from the survey, out of total of 143,352 students that have received the kit in academic year 2021-2022. Interaction's results of

the “Igiene Insieme – 2021/2022” programme are reported in Table 1.

Knowledge & behaviors

Pre-Programme: After administering the questionnaire Q1, it emerged that 200 teachers (38.5%) know the nudge approach before starting “Igiene Insieme” programme. Teachers also reported that 12,575 students (74.0%) understand the importance of washing hands with soap and water in order to protect them from disease and illness; 10,209 students (60.1%) demonstrate to know how to correctly wash their hands (with soap and water for 20 seconds using a correct technique); 12,711 students (74.8%) know the existence of alternative solutions when soap and running water are not available; 11,091 students (65.3%) know when to wash hands (occasions when handwashing is required: before eating or handling food, after visiting the toilet, after blowing the nose/sneezing of coughing, before touching a cut or wound, when they first get to school or arrive at home). About behaviors, 11,359 students (66.9%) report washing their hands correctly, with soap and water, for 20 seconds, at appropriate times; 11,091 students (65.3%) were observed by their teachers washing hands correctly and at appropriate times (before food, after the toilet). It also emerged that 650 students with complex communication needs know how to wash their hands correctly. Before starting the “Igiene Insieme” project, a total of 9,396 individual have adopted correct hand washing practices.

Post-programme: After administering the questionnaire Q2, 514 teachers (98.9%) learned what the nudge approach is (with an increase of +60,4%, compared with pre-questionnaire. Teachers also reported that 15,502 students (91.3%) understand the importance of washing hands with soap and water in order to protect them

from disease and illness (+17.3%); 14,156 students (83.3%) know how to correctly wash their hands, with soap and water for 20 seconds using a correct technique (+23.2%); 15,848 students (93.3%) know the existence of alternative solutions when soap and running water are not available (+18.5%); 14,929 students (87.9%) know when to wash hands and the key occasions when handwashing is required: before eating or handling food, after visiting the toilet, after blowing the nose/sneezing of coughing, before touching a cut or wound, when they first get to school or arrive at home (+22.6%). About behaviors, 15,208 students (89.5%) report washing their hands correctly, with soap and water, for 20 seconds, at appropriate times (+22.6%) and 14,929 students (87.9%). The analysis showed that 878 students with complex communication needs know how to wash their hands correctly (+35.1%).

At the end of the “Igiene Insieme” project, a total of 13,560 individual have adopted correct hand washing practices, with an increase of +69.3%, compared to the beginning of the project. Results of the questionnaire Knowledge and Behaviors of the “Igiene Insieme – 2021/2022” programme are reported in Table 2.

Section 2

Participants

In the Lombardy Region, 360 primary schools participated in the “Igiene Insieme-2021/2022” project and 225 of them responded to the survey form called “Hygiene and COVID-19 in schools”, with a response rate of 63%. In the Apulia Region, 167 primary schools took part in the project and 120 (72%) responded to the survey form.

Table 1. Interaction of the “Igiene Insieme – 2021/2022” programme.

Interaction	Total Involved	Pre-Programme	Post-Programme
Primary schools	1,991	472	472
Teachers	5,973	520	520
Students	143,352	16,988	16,988

Data extraction in Lombardy region

During January 2022, after 4 weeks of observation, 5,041 school cases of COVID-19 were reported in the 225 schools of the region responding to the project, out of a total of 52,321 students. The cases of SARS-CoV-2 infection recorded in the Lombardy Region in January 2022 (age group: 6-10-year) were 69,393 out of a total population of 470,271 children aged between 6-10 years (242,538 males and 227,733 females). The incidence rate recorded in the Lombardy primary schools adhering to the "Igiene Insieme-Year 2" project was 9.6% while the ratio in non-adherent schools was 15.4%. The incidence rate recorded in the Lombardy primary schools adhering to the "Igiene Insieme-Year 2" project was lower than the regional ratio: 9.6% vs 14.8% (p-value < 0.001). Data extraction in Lombardy region is reported in Table 3.

Data extraction in Apulia Region

During January 2022, after 4 weeks of observation, 3,588 school cases of COVID-19 were reported in the 120 Apulian schools responding to the project, out of a total of 33,464 students. The cases of SARS-CoV-2 infection (age group: 6-10-year) recorded in January 2022 in the Apulia Region were 21,114, out of a total population of 176,232 children aged between 6-10 years. The incidence rate recorded in the Apulian primary schools adhering to the "Igiene Insieme-Year 2" project was 10.7% while the ratio in non-adherent schools was 12.3%. The incidence rate recorded in the Apulian primary schools adhering to the "Igiene Insieme-Year 2" project was lower than the regional ratio: 10.7% vs 12.0% (p-value < 0.001). Data extraction in Apulia region is reported in Table 4.

Table 2. Results of the questionnaire Knowledge and Behaviors of the "Igiene Insieme – Year 2021/2022" programme.

Knowledge	Pre programme n° (%)	Post programme n° (%)	Difference %
Teacher’s knowledge of the nudge approach	200 (38.5%)	514 (98.9%)	+60.4%
How many pupils understand the importance of washing hands with soap to protect them from disease/illness	12,575 (74.0%)	15,502 (91.3%)	+17.3%
How many pupils know how to wash their hands correctly	10,209 (60.1%)	14,156 (83.3%)	+23.2%
How many pupils know the existence of alternative solutions when soap and running water are not available	12,711 (74.8%)	15,848 (93.3%)	+18.5%
How many pupils know when to wash their hands	11,091 (65.3%)	14,929 (87.9%)	+22.6%
Behaviors	Pre programme n° (%)	Post programme n° (%)	Difference %
How many pupils report washing their hands properly	11,359 (66.9%)	15,208 (89.5%)	+22.6%
How many pupils, observed by the teacher, wash their hands correctly (when it is necessary)	11,091 (65.3%)	14,929 (87.9%)	+22.6%
How many pupils with complex communication needs know how to wash their hands correctly (in absolute number)	650	878	+35.1%

Table 3. Data extraction in Lombardy region. p-value <0.001. Data refer to the month of January 2022, the age group considered is 6-10 years.

Lombardy	Lombardy Region	Igiene Insieme	Igiene Insieme-Non Adherent
Total Population	470,271	52,321	417,950
Cases	69,393	5,041	64,352
Incidence Rate	14.8%	9.6%	15.4%

Table 4. Data extraction in Apulia region. p-value <0.001. Data refer to the month of January 2022, the age group considered is 6-10 years.

Apulia	Apulia Region	Igiene Insieme	Igiene Insieme - Non Adherent
Total Population	176,232	33,464	142,768
Cases	21,114	3,588	17,526
Incidence Rate	12.0%	10.7%	12.3%

Discussion

Our study revealed that hand hygiene is an important measure for children of primary schools in order to prevent the spread of diseases. The project “Igiene Insieme - 2021/2022” has led to a global improvement in students’ knowledge of hand hygiene: +17.3% learned the importance of washing hands with soap and water in order to protect them from disease and illness; +23.2% learned how to correctly wash their hands using a correct technique; +18.5% learned the existence of alternative solutions when soap and running water are not available and +22.6% learned when to wash hands. This improvement was also recorded in student’s behaviors: +22.6% of students report washing hands correctly, with soap and water, for 20 seconds, at appropriate times and +22.6% students were observed by their teachers washing hands correctly and at appropriate times. It is particular noteworthy that, at the end of the “Igiene Insieme” project, it was recorded an increase of +69.3% of individuals that have adopted correct hand washing practices compared to the beginning of the project.

A lower incidence of SARS-CoV-2 infections was detected in the primary schools participating in the project compared to the average of the two regions considered: 9.6% in Lombardy primary schools (against the regional average 14.8%) and 10.7% in the Apulian primary schools (against 12.0% in the Apulia Region), showing how student’s adherence to healthy behaviors potentially contributed to limit infection spread in the school setting. These data demonstrate the great potential of the school-based health education campaign.

We acknowledge limitations in the impact assessment analysis which might have introduced information bias: the survey was conducted on a sample of

schools that joined the “Igiene Insieme” project on a voluntary basis and the study included observational data reported by teachers themselves. Despite possible biases, the improvement in student’s behavior suggests a positive effect of the educational campaign and a general increase in hygiene knowledge. It is important to continue to teach and implement good health practices in order to prevent the spread of infections. This aspect is also highlighted by the reduced incidence of SARS-CoV-2 in the schools participating in the project compared to non-adherent. According to different studies (7,18-20), health and prevention programs can be particularly promising if integrated into the education system at an early stage. Children attending primary school are in an age group where it’s easier to learn correct behaviors and habits and school-based behavioral interventions can support children to develop independent and healthy hygiene behaviors, which can endure throughout adulthood (21,22). Health promotion among school children is a participatory and inclusive process that must actively and directly involve students to enhance their learning, as highlighted by J.Randle et al. (21), using tools appropriate for their age⁽²³⁾. Moreover, children are likely to bring behavioral changes by passing on and communicating the health message received at school to their parents and family members, including their siblings (24,25). According to Pulimeno et al. (26), promoting students’ health at school has been found to engage in healthy habits also families and communities (a kind of multiplier effect): children can become health trainers of their parents, relatives and friends, impacting positively the entire society. The school context plays an important educational role but also the domestic one: health policies need to be target also at improving parent’s teaching of hygiene practices, emphasizing the importance of the home environment in children’s education (27,28).

In summary, good hygiene practice can reduce the incidence of infectious disease and hand hygiene is a key component of good hygiene practice. As shown, applying hand hygiene procedures correctly and at the right time helps to reduce the risk of infectious disease. The school context plays an important educational role and implementing health educational campaign in schools would help to improve adherence and correct hygiene behaviors. Cornerstone of these campaigns may be identified in healthcare professionals, strictly interconnected with the school environment and well aware of the specific characteristics of the school settings (29).

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References

1. WHO guidelines on hand hygiene in health care: a summary. World Health Organization; 2009. Report No. WHO/IER/PSP/2009.07.
2. Kingston L, O'Connell NH, Dunne CP. Hand hygiene-related clinical trials reported since 2010: a systematic review. *J Hosp Infect.* 2016;92(4):309–20. doi:10.1016/j.jhin.2015.11.012.
3. Von Lengerke T, Lutze B, Krauth C, et al. Promoting Hand Hygiene Compliance: PSYGIENE—a Cluster-Randomized Controlled Trial of Tailored Interventions. *Dtsch Arztebl Int.* 2017; 114(3):29–36. doi:10.3238/arztebl.2017.0029.
4. Best M, Neuhauser D. Ignaz Semmelweis and the birth of infection control. *Qual Saf Health Care.* 2004;13(3):233–4. doi:10.1136/qhc.13.3.233.
5. Curtis V, Danquah L, Aunger R. Planned, motivated and habitual hygiene behaviour: An eleven country review. *Health Educ Res.* 2009;24:655–73. doi:10.1093/her/cyp002.
6. WHO UNICEF Joint Monitoring Programme for Water Supply and Sanitation Global water supply and sanitation assessment 2000 report. Switzerland; 2000 p.80 ISBN: 9241562021
7. Lee RL, Loke AY, Wu CS, et al. The lifestyle behaviours and psychosocial well-being of primary school students in Hong Kong. *J Clin Nurs.* 2010;19(9–10):1462–72. doi:10.1111/j.1365-2702.2009.03057.x.
8. Jatrana S, Hasan MM, Mamun AA, et al. Global Variation in Hand Hygiene Practices Among Adolescents: The Role of Family and School-Level Factors. *Int J Environ Res Public Health.* 2021;18(9):4984. doi: 10.3390/ijerph18094984
9. Mbakaya BC, Kalembo FW, Zgambo M. Use, adoption, and effectiveness of tippy-tap handwashing station in promoting hand hygiene practices in resource-limited settings: a systematic review. *BMC Public Health.*2020;20(1):1005. doi:10.1186/s12889-020-09101-w.
10. Lau CH, Springston EE, Sohn MW, et al. Hand hygiene instruction decreases illness-related absenteeism in elementary schools: a prospective cohort study. *BMC Pediatr.*2012;12(1):52. doi: 10.1186/1471-2431-12-52.
11. Nandrup-Bus I. Mandatory handwashing in elementary schools reduces absenteeism due to infectious illness among pupils: A pilot intervention study. *Am J Infect Control.* 2009;37(10):820–6. doi: 10.1016/j.ajic.2009.06.012.
12. Klar K, Knaack D, Kampmeier S, et al. Knowledge about Hand Hygiene and Related Infectious Disease Awareness among Primary School Children in Germany. *Children*(Basel). 2022;9(2):190. doi:10.3390/children9020190.
13. Guinan M, McGuckin M, Ali Y. The effect of a comprehensive handwashing program on absenteeism in elementary schools. *Am J Infection Control.* 2002;30(4):217–20. doi: 10.1067/mic.2002.120366.
14. Hammond B, Ali Y, Fendler E, et al. Effect of hand sanitizer use on elementary school absenteeism. *Am J Infect Control.* 2000;28(5):340–6. doi: 10.1067/mic.2000.107276.
15. Azor-Martinez E, Cobos-Carrascosa E, Seijas-Vazquez ML, et al. Hand Hygiene Program Decreases School Absenteeism Due to Upper Respiratory Infections. *J Sch Health.* 2016;86(12):873–81. doi: 10.1111/josh.12454.
16. Chittleborough CR, Nicholson AL, Young E, et al. Implementation of an educational intervention to improve hand washing in primary schools: process evaluation within a randomised controlled trial. *BMC Public Health.*2013;13(1):757. doi: 10.1186/1471-2458-13-757.
17. Odone A, Bricchi L, Signorelli C. COVID-19 control school-based interventions: characteristics and impact of a national-level educational programme in Italy. *Acta Biomed.* 2021;92(S6): e2021495–e2021495. doi: 10.23750/abm.v92iS6.12327.
18. Celik LA, Panceo DL. Healthy school environment: effectiveness of hand washing instruction in an elementary school setting. *NASN Sch Nurse.*2012;27(4):194–6. doi: 10.1177/1942602X12444451.
19. Crosby S, Laird K, Younie S. Interactive health-hygiene education for early years: the creation and evaluation of

- learning resources to improve understanding of handwashing practice. *International Journal of Early Years Education*. 2019;27(4):374–90. doi: 10.1080/09669760.2019.1628010.
20. Lehotsky Á, Falus A, Lukács Á, et al. Orvosi Hetilap. 2018;159(12):485–90. [Hungarian] doi: 10.1556/650.2018.31031.
21. Randle J, Metcalfe J, Webb H, et al. Impact of an educational intervention upon the hand hygiene compliance of children. *J Hosp Infect*. 2013;85(3):220–5. doi: 10.1016/j.jhin.2013.07.013
22. Bloomfield SF, Aiello AE, Cookson B, et al. The effectiveness of hand hygiene procedures in reducing the risks of infections in home and community settings including handwashing and alcohol-based hand sanitizers. *Am J Infect Control*. 2007;35(10):S27–64. doi: 10.1016/j.ajic.2007.07.001
23. Rutter S, Macduff C, Stones C, et al. Evaluating children's handwashing in schools: an integrative review of indicative measures and measurement tools. *Int J Environ Health Res*. 2021;31(1):1–19. doi: 10.1080/09603123.2019.1625032.
24. Rohde J, Sadjimin T. Elementary-school pupils as health educators: role of school health programmes in primary health-care. *Lancet*. 1980;315(8182):1350–2. doi: 10.1016/S0140-6736(80)91797-3.
25. Garg A, Taneja DK, Badhan SK, et al. Effect of a school-based hand washing promotion program on knowledge and hand washing behavior of girl students in a middle school of Delhi. *Indian J Public Health*. 2013;57(2):109–12. doi: 10.4103/0019-557X.115009.
26. Pulimeno M, Piscitelli P, Colazzo S, Colao A, Miani A. School as ideal setting to promote health and wellbeing among young people. *Health Promot Perspect*. 2020; 10(4):316–24. doi: 10.34172/hpp.2020.50.
27. Scott E, Bloomfield SF, Exner M, et al. Prevention of the spread of infection: the need for a family-centered approach to hygiene promotion. *Am J Infect Control*. 2010;38(1):1–2. doi: 10.1016/j.ajic.2009.11.001.
28. Bloomfield SF, Signorelli C, Fara G. Developing and promoting hygiene in the home and community. *Ann Ig*. 2010;22(1):1–8.
29. Riccò M, Vezzosi L, Gualerzi G, Signorelli C. Knowledge, attitudes and practices (KAP) towards vaccinations in the school settings: an explorative survey. *J Prev Med Hyg*. 2017;58(4): e266–78. doi:10.15167/2421-4248/jpmh2017.58.4.673.

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