

**About this sample introduction:** This introduction comes from an empirical research paper published in the *International Quarterly of Community Health Education*:

Pasewaldt, S. E., Baller, S. L., Blackstone, S. R., & Bryan Malenke, L (2019). Impact of a hand hygiene curriculum and group handwashing station at two primary schools in East Africa. *International Quarterly of Community Health Education* 39(3), 175-187. <https://doi.org/10.1177/0272684X18819968>

JMU alumna Stephanie Pasewaldt (class of 2018) conducted the research described in this article introduction as part of her [Honors capstone project](#) in Health Sciences. After graduating, she revised and published her manuscript with the assistance of her project advisor and readers, whom she listed as co-authors. This empirical research article, like many, combines the introduction and literature review into a single opening section. An introduction overview with writing strategies and other resources for writing empirical research papers are available at [this link](#).

In the opening sentence, the writers describe the broad problem the study will respond to. By establishing lack of access to WASH as a human rights issue that affects millions of children, they emphasize both the practical significance of the problem and its scope.

The following two sentences illustrate what is at stake if the problem goes unaddressed.

As is common in the opening paragraph of an introduction, the writers support their claims with statistical evidence.

## **Impact of a hand hygiene curriculum and group handwashing station at two primary schools in East Africa**

Fundamental rights concerning access to water, sanitation, and hygiene education, termed as WASH, are not afforded to millions of children around the world. As a result of inadequate WASH, the transmission of disease proliferates causing high morbidity and mortality rates.<sup>1</sup> More than 1.4 million children die of preventable diarrheal, respiratory, and intestinal diseases every year.<sup>1</sup>

Notice that in the opening paragraph, there is no mention of the present study, the research question, or the researchers. This is typical. Usually, there is no mention of the present study until the final paragraph(s) of the introduction.

This article uses numerical superscripts to reference sources, as prescribed by the *AMA Manual of Style* and the publishing journal. The reference list for this article is not provided here but can be accessed via the link in the citation above.

Schools are in a critical position to promote health and hygiene for their students, since WASH issues pose a significant threat to a child's education and future.<sup>2-4</sup> Lack of WASH is related to frequent student absences;<sup>5</sup> students can easily spread diseases to their peers at school and are forced to stay home when they are ill, which negatively impacts academic performance and drop-out rates.<sup>6</sup> Furthermore, the association

This paragraph begins the review of literature, narrowing the focus of the article to the relationship between schools and WASH, which readers can assume the present study will address in some way.

Within literature reviews—and any highly technical form of writing—good transitions are vital. Note the use of the transition “despite” and how the authors use familiar concepts (harmful consequences / lack of WASH) to lead into new ones.

Scientific writing tends to focus on the findings of research studies.

Notice that the names of researchers, articles, and journals do not appear in this review of literature (though readers can access that information in the reference list).

For papers following APA style guidelines, the last names of authors are provided via parenthetical or in-text citations, but additional information is typically reserved for the reference list.

This focus on findings facilitates synthesis and helps with concision. Empirical research papers in humanities disciplines may follow different conventions.

between WASH and school attendance plays a critical role for females, who periodically miss days of school at a time due to menstruation.<sup>5,7,8</sup>

One study suggests that access to proper WASH facilities at school would improve female attendance, thus reducing gender disparities found

between the attendance and academic performance of males and females.<sup>7</sup>

Despite the harmful consequences of lack of WASH in schools, fewer than 50% of the world’s primary schools are able to provide students with proper hygiene education and access to adequate sanitation facilities, primarily due to lack of funding.<sup>9</sup> Improvement and change is possible though, even in schools with the most limited resources, through simple and sustainable approaches and interventions.<sup>1</sup>

Although some studies show no significant differences in health outcomes through various WASH interventions,<sup>10–13</sup> there are multiple systematic reviews of WASH interventions that do demonstrate improved health outcomes.<sup>14,15</sup> Other benefits of WASH interventions suggest that they may support improved health outcomes long term.<sup>7,15–21</sup> Specifically, the promotion of handwashing with soap is the single most effective and cost-efficient WASH intervention that can be implemented to improve and save children’s lives.<sup>22</sup> Handwashing with soap can prevent the transmission of hygiene-related diseases, which can subsequently improve the attendance and academic achievement of students in the long term.<sup>6,22</sup> Through simple handwashing behavior changes, deaths attributed to diarrhea and respiratory disease, the leading causes of child mortality, may

Note that this paragraph synthesizes the findings of seven related studies, rather than summarizing them one-by-one.

Once again, notice how the focus of the introduction is narrowing. The authors have moved us from WASH → relationship between WASH and schools → the benefits of WASH interventions → the effectiveness of handwashing as an intervention → the feasibility of handwashing interventions in schools.

In summarizing the state of knowledge on the research topic, it’s important to address relevant discrepancies or disagreements. Here, the authors highlight conflicting study outcomes, but they also help readers evaluate these contradictory findings. Not only is *multiple* more than *some*, but also *systematic reviews* are stronger evidence than *single studies*. Thus, the authors justify the choice to focus on WASH interventions.

In scientific writing, avoid filler words such as *actually*, *extremely*, and *really*. Common in colloquial speech, these words are often unnecessary in formal writing. Ask yourself, “Would the meaning of this sentence change if I cut this word?” If the answer is no, cut it.

actually decrease by 50% and 25%, respectively.<sup>14</sup> A recent review found encouraging results suggesting handwashing promotion at schools could reduce episodes of diarrhea by 30% in developing countries.<sup>23</sup> In addition to its suggested effectiveness, improving handwashing-related knowledge and behaviors is also a feasible target for schools to begin improving WASH conditions due to the simplicity, cost-efficiency, and flexibility of handwashing promotion programs.<sup>8,22</sup>

Research surrounding WASH promotion programs has highlighted numerous types of interventions used to promote healthy handwashing behaviors.<sup>15</sup> Educational interventions have been shown to improve handwashing knowledge and beliefs,<sup>4,17,18</sup> which are influential in motivating handwashing behavior.<sup>17,19,24</sup> Existing educational curricula provided by nonprofit and government organizations promote similar handwashing themes but teaching methods utilized have varied based on schools’ contexts.<sup>8,9</sup> Handwashing promotion literature portrays a variety of activities that can be incorporated into such education curriculums, including handwashing competitions, songs, dramas, and demonstrations.<sup>14,21,23,25–27</sup>

Environmental interventions, such as handwashing station infrastructures, have been shown to increase handwashing behavior by eliminating physical barriers to the behavior in students’ environment.<sup>16,19,21</sup> Handwashing stations and promotion programs have frequently been implemented at schools in developing countries and have

This sentence hints at the gap in research that the present study will fill. Because methods are varied and context-dependent, there’s likely a need to research their efficacy.

The literature reviews in empirical research paper introductions are usually organized thematically. Sentences like this one, which describe trends or key themes in existing research, work well as topic sentences.

ranged in design from simple tippy taps with plastic bottles<sup>16,21</sup> to elaborate polyvinyl chloride (PVC)-piped basin systems<sup>28</sup> depending on the school's resources. Furthermore, it has been suggested handwashing stations that allow multiple students to wash their hands at the same time result in improved handwashing behaviors in the short and long term, because the behavior becomes a social activity and a social norm.<sup>8,24,25,28</sup>

One of the challenges of writing a literature review is synthesizing information from many sources into a cohesive narrative—in this case, the story of how and why this research project came to be. Writers must show how the concepts and studies in the literature review connect to each other *and* connect to the present study.

Notice how this paragraph shows the relationship between the interventions described in the previous two paragraphs. This not only helps readers understand how existing WASH interventions might complement each other but also helps justify the use of both interventions in the present study.

The first mention of the present study occurs here, at the end of the seventh paragraph of the introduction.

The literature largely supports implementing both educational and environmental interventions, rather than only a single intervention, in handwashing promotion programs generate more effective, sustainable results.<sup>16,19,21,29</sup> Education is a vital component in encouraging handwashing behavior; however, without proper infrastructure in the environment, handwashing behavior cannot be carried out.<sup>19,21</sup> In a study of handwashing and other hygiene behaviors, researchers found educational interventions create motivation for behavior change, but environmental interventions are necessary to facilitate actual behavior change.<sup>19</sup> The efficacy of a two-pronged approach may be explained by the integration of multiple theories to promote handwashing, since this type of framework is more likely to impact individual, interpersonal, societal, and contextual handwashing behavior determinants.<sup>16,29,30</sup> Consequently, this study's interventions are built upon a framework integrating both the Health Belief Model and Integrated Behavioral Model for Water, Sanitation, and Hygiene<sup>30</sup> to target individual and contextual influences of handwashing.

Notice how the authors qualify this interpretation with the word *suggested*. When discussing theories, ideas, or findings, it is important to present claims or concepts with an appropriate degree of certainty (or uncertainty) based on the available evidence. Writers can use words like *may*, *might*, *could*, *appears*, and *indicates* to moderate their claims.

This sentence offers a theoretical framework for the present study. By grounding it in two existing theoretical models, the authors not only legitimize their approach but also indicate how the design of their study might be evaluated or compared to other studies.

This sentence articulates the gap in knowledge that the present study will fill. It also pinpoints the broader purpose of the research project—to “improve best practices for handwashing promotion and behavior change.”

More empirical research is needed to further understand the relationship between handwashing and educational and environmental interventions in order to improve best practices for handwashing promotion and behavior change. The purpose of this study was to pilot a handwashing promotion program at two primary schools in East Africa that included both an educational and an environmental intervention and then to examine the program’s short-term impact on students. Specifically, the program comprised a 6-day hand hygiene curriculum and the installation of a group handwashing station at each school. The objective of the study was to improve students’ knowledge, attitudes, and behaviors regarding handwashing. This study also aimed to uniquely examine how a handwashing promotion program impacted students at a rural primary school versus how the same program impacted students at an urban primary school and provide insight regarding different types of group handwashing stations.

What follows is not the purpose of the study (which was stated in the previous sentence) but a description of its design.

Typically, the final paragraph of an introduction to an empirical research question briefly describes the methods used in the study. This paragraph describes the handwashing interventions but not the methods used to assess their impact.

Again, the authors’ language is imprecise. What follows is not the objective of the study itself but rather the objective of the intervention. The study’s objective was to evaluate the impact of the handwashing program.

Here, the authors describe a secondary research question.