

Improving awareness of foreign domestic workers during the COVID-19 pandemic using infographics: An experience during the crisis

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Abstract: The COVID-19 epidemic is a significant humanitarian crisis witnessed in contemporary times, necessitating the exploration of techniques and approaches that might augment the capabilities of individuals within society to mitigate the adverse consequences of this pandemic. Domestic workers have always been an important part of societal structure, and it is essential to ensure their awareness about the perils of the pandemic as well as implement preventive measures. This is crucial in order to effectively address the hazards associated with the ongoing epidemic. The primary objective of this study was to assess the efficacy of infographic technology in augmenting the level of knowledge among foreign domestic workers on the COVID-19 epidemic. The present study employed a quasi-experimental design to examine and compare the effects of infographic technology on the experimental group, while the control group received only public awareness messages disseminated to all citizens and residents. The study sample comprised (16) foreign domestic workers, who were assigned to the two research groups through a random allocation process. The development of the COVID-19 pandemic awareness scale was conducted. The measurement scale consisted of three dimensions: the cognitive awareness dimension, including a set of (12) statements; the performative awareness dimension, comprising a set of (8) statements; and the psychological awareness dimension, comprising a set of (10) statements. The findings demonstrated the superiority of the experimental group, which used the infographic approach, over the control group in fostering awareness of the COVID-19 epidemic throughout its three dimensions among the participants of the study. The study suggested the need of expanding the utilization of infographics in an attempt to enhance knowledge and awareness of the COVID-19 pandemic, alongside the establishment of varied databases for migrant domestic workers. The objective is also to develop an extensive digital awareness strategy about the impacts of the COVID-19 epidemic, so as to include an increased number of informative infographics.

Keywords: infographic; foreign domestic workers; COVID-19 pandemic

1. Introduction

The COVID-19 pandemic has emerged as a significant global event, giving rise to widespread human panic, and exerting profound effects across various domains, including health, economy, and education (Alhalafawy and Zaki, 2022). Moreover, it has directly impacted individuals' health, leading to heightened levels of anxiety, stress, and depression. In order to mitigate the adverse consequences of the pandemic, it is essential for governments to take appropriate measures (Roy et al., 2020). Undoubtedly, a dearth of understanding about the ramifications of the COVID-19 epidemic has the potential to result in significant harm; with the disease's quick spread, its effects on people's public health, and the financial difficulties brought on by the

widespread shutdown are all apparent (Villius Zetterholm and Jokela, 2023).

Hence, it is crucial to emphasize the significance of information awareness for all sectors of society, encompassing both physical and mental health aspects, amidst the COVID-19 pandemic. In this context, Liem et al. (2020) study sheds light on the impact of the pandemic on foreign domestic workers, revealing that these particular individuals experience considerable challenges due to inadequate health insurance coverage, heightened psychological pressures during complete quarantine, and a lower quality of life compared to the native population. Furthermore, the consequences include the incapacity of some groups of domestic workers to get protective medical masks as a result of stringent quarantine laws implemented in certain nations. Within the current framework, Campbell (2020) highlights the significance of recognizing domestic workers as fundamental constituents of the familial unit, thereby necessitating equitable care and attention during the COVID-19 crisis. Neglecting these individuals may result in the family's susceptibility to various health and psychological detriments. Therefore, it is vital to enhance educational initiatives targeting domestic workers in order to mitigate the risks associated with the COVID-19 pandemic. Additionally, it is crucial to explore strategies and resources that can facilitate their access to reliable information, thereby safeguarding their overall well-being. It is worth noting that a considerable proportion of domestic workers possess mobile phones, which can serve as a means for disseminating pertinent information. In order to mitigate the spread of COVID-19, it is essential to pass on awareness messages via broadcasting channels. These messages should be delivered in many languages to guarantee effective communication with diverse groups of domestic workers (Liem et al., 2020).

One of the primary technologies that can be used to build digital awareness systems for the COVID-19 pandemic and its ramifications is infographic technology, also known as informational images. These systems can then be used to broadcast the informational images to foreign domestic workers in the Kingdom of Saudi Arabia via mobile phones, helping them to combat the physical and mental health problems brought on by the pandemic. Infographics, often known as information visuals, offer a contemporary approach to visually conveying intricate facts and information (Lee and Cavanaugh, 2016). Infographics refer to the method of conveying information by using a substantial number of visual components, with the intention of capturing the recipient's attention and motivating them to comprehend the implied meanings of the presented material (Dur, 2014). Infographics are a kind of graphic representation that combines visuals with statistics or information, with the purpose of facilitating the delivery of succinct messages to people and organizations' target audiences. Infographics may be defined as visual depictions that effectively convey intricate facts and concepts to the intended audience, facilitating comprehension and expediting the acquisition process (Beegel, 2014).

The present study is built around a research gap that centers on the significance of domestic workers as a prominent category who engage in regular and direct interactions with all members of a family, hence constituting a crucial element within the Saudi household structure. Hence, the provision of care and education for this demographic is a fundamental strategy in safeguarding the welfare of society at large. Similar to their responsibilities, individuals also possess entitlements. In the present

context, Liem et al. (2020) state that prioritizing the prevention of COVID-19 among domestic workers is crucial. The authors emphasize that failure to provide them with adequate education and support may result in significant negative consequences, given their substantial role within the societal framework, wherein they both influence and are influenced by it. According to Rosemberg (2020) research, it is recommended that workers in domestic and hotel services be offered specialized programs to mitigate the impact of the pandemic. This is because they are particularly susceptible to the transmission of the disease due to their frequent interactions with a wide range of individuals. Additionally, these workers often face job insecurity during this time period. In a pertinent context, it is imperative to acknowledge that medical interventions alone are not the sole means to halt the COVID-19 pandemic. Rather, comprehensive awareness initiatives encompassing behavioral and psychological dimensions play a significant role in mitigating the transmission of the disease (Kwok et al., 2020).

As the COVID-19 pandemic continues its upward trend in the Kingdom of Saudi Arabia until 1 May 2020, it is necessary to combine efforts to search for solutions that can combat the spread of the pandemic or its effects. Given that foreign workers account for 76% of the total labour force in Saudi Arabia, according to the latest report issued by the General Authority for Statistics (<https://www.stats.gov.sa/ar/821-0>), it is important to pay attention to this group and try to raise their awareness of the pandemic and its effects in order to prevent the spread of the virus on the one hand, and to avoid mental health effects on the other hand. The importance of promoting awareness among foreign workers is magnified in the context of the health reports issued on a daily basis by the Ministry of Health in the Kingdom of Saudi Arabia during the crisis, which indicated that the infection rate of COVID-19 as of 1 May 2020 was approximately (75%) for foreign workers and (25%) for Saudis, which calls for the need to pay attention to foreign workers and try to educate them to minimize the negative effects of the spread of COVID-19.

In the context of a research team's exploratory study, conducted amidst a crisis, the focus is on (7) domestic workers in the city of Jeddah, Kingdom of Saudi Arabia. This group comprises four housekeepers and three drivers who possess fluency in English but lack proficiency in Arabic. The objective of the study is to assess the level of awareness among domestic workers regarding behavioral precautionary measures. The research team collaborates with household heads to gather relevant data. The research team observed a significant decline in the degree of knowledge pertaining to COVID-19, with an average awareness rate of 33.3% on the scale items used in the study. This decline was identified as a potential factor contributing to the prevention of COVID-19. The preliminary findings indicate the need for implementing initiatives aimed at increasing awareness among domestic workers. This is particularly crucial considering that the investigation into the causes of this decline revealed that a considerable proportion of domestic workers lack proficiency in reading and writing in Arabic. This deficiency may impede their comprehension of instructions and precautionary measures required to mitigate the adverse impacts of the COVID-19 pandemic. Despite the Ministry of Health's ongoing efforts to disseminate text messages via mobile phones to all inhabitants of the Kingdom of Saudi Arabia as a means to enhance awareness on the COVID-19 virus, it is worth considering that the

cognitive effects of these messages may be unsustainable. The research conducted by Martin et al. (2019) indicated that using tools that integrate both textual and visual elements into a single template is more suitable for promoting health and community awareness compared to relying only on text messages. This is because text messages tend to have limited retention in memory over extended periods of time.

In consideration of the previous information and in response to the prevailing discourse emphasizing the imperative nature of initiatives aimed at augmenting the public's awareness for the COVID-19 epidemic (Rubin et al., 2020), and that digital technologies have emerged as a viable means of delivering assistance to those impacted by the epidemic (Chick et al., 2020), the primary objective of the present study was to utilize infographic technology as a means to augment the awareness of foreign domestic workers regarding the COVID-19 pandemic; bearing in mind that infographics have been shown to be more persuasive in effectively communicating information and addressing complex issues compared to conventional approaches (Dalton and Design, 2014). Additionally, infographics are known to be visually appealing and rich in information. Furthermore, Arslan and Toy (2015) argue that the presentation of challenging and intricate information is not only amusing but also has an additional purpose. According to Lee and Cavanaugh (2016), infographics provide material that is not only more memorable than other presentation styles but also more successful in facilitating the circulation and interchange of information. Furthermore, several studies have shown the efficacy of infographics as a valuable instrument in the facilitation of health-related awareness campaigns (Chicca and Chunta, 2020; Locoro et al., 2017; Martin et al., 2019; Siricharoen, 2015).

Talking about infographics means using them as effective tools for developing visual thinking, as well as promoting immersion in the issues of the content contained in these information images. According to Evans (2016), one of the most important features of infographics is the low cost of producing them compared to the benefits they can provide, encouraged by the proliferation of many free applications that can be relied upon to produce this type of visualization. In a rhetorical context, Kelly (2016) states that infographics were developed to last, as they rely on colours to address the eyes, and therefore are persuasive and facilitate the assimilation of complex information. Grainger et al. (2020) state that the most important characteristic of infographics is that they are currently considered a mass medium, so it is important to rely on them more extensively in awareness-raising processes. Therefore, the current research aims to determine the impact of using infographics in developing awareness among domestic workers during the pandemic. This is related to the fact that improving the safety climate for workers is one of the basic normative requirements of the work environment (Fagnoli and Lombardi, 2020). Occupational health and safety (OHS) is a requirement for all categories of workers in any sector and under any circumstances and promoting OHS should be a priority before doing the work itself (Öztürk, 2023).

However, this current research aimed at addressing the following primary question:

- (RQ1): To what extent does the suggested design of graphical technology contribute to enhancing awareness of the COVID-19 pandemic among foreign domestic workers?

In order to respond to the preceding inquiry, it is important to assess the soundness and credibility of the present hypothesis.

- (H1): There is no statistically significant difference, with a significance level of 0.05 or higher, observed in the average awareness levels between the experimental group (utilizing infographic technology) and the control group (relying on regular awareness messages disseminated by the Ministry of Health) in the post-measurement of COVID-19 pandemic awareness indicators. This lack of difference can be attributed to the impact of infographic technology.

2. Literature review

2.1. Infographic technique

Infographics are a prevalent technological tool that is referred to by several titles, such as visualization, data visualization, information design, and information architecture. One of the most prevalent and well recognized terms is “infographic,” which is an abbreviation of “Information Graphics” (Love-Rutledge and Robinson, 2020; Polman and Gebre, 2015). Infographics have gained significant popularity due to the proliferation of graphic programs and applications, enabling the integration of text and images into a unified template. This facilitates the creation of concise and visually appealing messages, which can effectively foster public awareness processes (Grainger et al., 2020). Infographics are visual aids designed to streamline intricate information and convey it within a visual framework, with the objective of enhancing the understanding and engagement of a broad range of individuals comprising the intended audience (Eyal and Gil, 2020). Infographic is a significant instrument that plays a crucial role in reflecting the digital media era. It focuses on the utilization of ubiquitous digital graphics to effectively transmit advertising messages using concise language and evocative pictures (Dick, 2019). Infographics are meticulously structured visual representations that are strategically crafted to communicate a precise message via the integration of visual and linguistic elements (Li et al., 2015). According to Harrison et al. (2015), using narratives is a successful method for converting abstract facts and knowledge into captivating tales. Additionally, it functions as a concise instrument for communicating fundamental knowledge and information pertaining to a subject matter using a limited combination of visually appealing visuals and succinct textual content (Lee and Cavanaugh, 2016). Infographics are sometimes described as a comprehensive digital platform for visual education, and their efficacy is enhanced by the use of social media networks that facilitate the sharing, commenting, and interactive engagement with these visual representations (Falk, 2016). Consequently, an infographic serves as a visual instrument for succinctly presenting a substantial volume of data. According to Rueda (2015), infographics may vary in complexity, ranging from basic graphs to more intricate narratives conveyed by a sequence of pictures. According to Siricharoen (2015), infographics have a purpose beyond mere illustration; their primary objective is to simplify complicated information and elucidate how challenging concepts may be made comprehensible and accessible via employing a graphical language.

According to Siricharoen (2015), the utilization of infographic technology is considered a significant technical tool for spreading health and physical awareness

messages. This is attributed to its exceptional capacity to present and communicate information in a simplified manner that can be easily comprehended as well as its convenience in being shared through mobile devices. According to Chicca and Chunta (2020), the utilization of infographic technology as a primary technical tool in simplifying health information for students in medical and nursing colleges suggests its potential as a fundamental technology for promoting awareness regarding physical and mental health. This is attributed to the capacity of infographics to simplify intricate information and enhance its comprehensibility. According to Martin et al. (2019), there is a belief that infographic technology is more effective than text tools in health awareness campaigns. This is primarily due to the ability of infographics to swiftly circulate through social media platforms accessible on mobile devices. Additionally, the information conveyed through infographics has the potential to be retained in memory for extended periods of time. In a relevant research context (Locoro et al., 2017) claim that the use of infographic technology is a highly appropriate approach for conducting digital awareness campaigns pertaining to everyday encountered challenges.

2.2. Awareness of the COVID-19 pandemic

The concept of awareness encompasses various dimensions that serve as the foundation for its definition. These dimensions include the acquisition of knowledge and information, which pertains to the cognitive aspect. Additionally, awareness involves the acquisition of behaviors and performances based on prior knowledge, which relates to the performative aspect. Lastly, awareness entails recognizing the significance of knowledge and developing a positive attitude towards it, which corresponds to the emotional aspect (Pieterse et al., 2013). According to Zhong et al. (2020), it is crucial to prioritize the measurement of awareness regarding the pandemic among foreign residents and expatriates. Additionally, it is essential to implement appropriate programs aimed at enhancing this awareness. This approach is necessary to attain optimal levels of prevention within society, given that expatriates and residents constitute a significant demographic group. Neglecting to acknowledge and prioritize the crucial individuals within society might have dire consequences, perhaps resulting in the loss of control over the current pandemic. In the given context, Chan et al. (2020) emphasize the significance of prioritizing pandemic awareness initiatives during crises. The authors underscore the necessity of implementing clear and targeted awareness programs that provide organized information to various groups. This study effectively highlights strategies for managing the pandemic, preventive measures, and the implementation of constructive behaviors to mitigate the transmission of the disease and minimize psychological impact on individuals.

Within this particular context, the research conducted by Zhong et al. (2020) revealed that raising awareness of the COVID-19 pandemic acts as an initial and crucial strategy in combatting the dissemination of the pandemic and safeguarding the physical and mental well-being of individuals. The research emphasized the importance of prioritizing awareness by examining three primary domains, which are delineated as follows:

- Cognitive awareness of the COVID-19 pandemic: This pertains to the

dissemination of comprehensive theoretical knowledge to individuals, including aspects such as the pandemic's modes of transmission, mechanisms of infection, and preventive measures.

- Performative consciousness of the COVID-19 pandemic: This aspect pertains to the execution of necessary measures aimed at mitigating the spread of the pandemic. These measures encompass activities such as wearing masks, adhering to social distancing guidelines, engaging in regular sanitization practices, and other performative actions undertaken by individuals to actively prevent the transmission of COVID-19.
- Psychological consciousness regarding the COVID-19 pandemic: This pertains to an individual's attitudes towards the pandemic and strategies for maintaining psychological equilibrium amidst the potential stressors associated with precautionary measures. These stressors can potentially induce anxiety, psychological tension, and even depression.

Despite numerous efforts to address cognitive and performance awareness in the context of the COVID-19 crisis, it is crucial to prioritize psychological awareness. Neglecting this aspect can lead to significant challenges in various dimensions of mental well-being, including the manifestation of anxiety, stress, depression, and other psychological factors (Wang et al., 2020). In a relevant context, Roy et al. (2020) elucidated that the abandonment of statistical awareness, specifically the dissemination of statistics and data pertaining to disease transmission rates and the number of infected individuals, can contribute to the proliferation of psychological disorders such as anxiety, stress, and depression. Consequently, it is imperative to address this issue. The recognition of the COVID-19 pandemic as an entire system necessitates the dissemination of diverse information including cognitive, performance, and psychological dimensions, with the ultimate goal of maximizing preventive measures against the adverse consequences of the pandemic.

3. Theoretical framework

3.1. Theoretical principles of infographic technology

The utilization of infographics within awareness-raising endeavors is associated with an array of theoretical frameworks, such as Stimulus generalization theory. This theory posits that the impact of a stimulus or situation extends to other stimuli and situations that bear resemblance to or center around it. This implies that when an individual encounters similar stimulus in a specific situation, the resulting effect is likely to extend to other situations which possess similarities in the initial situation. Moreover, the degree of similarity between these situations positively correlates with the likelihood of the transfer of the learning effect (Haass et al., 2016). Hence, the use of infographics in awareness campaigns may effectively facilitate the widespread transmission of the favorable ideas conveyed via these visual representations. Consequently, this contributes to the frequent reproduction and establishment of constructive awareness pertaining to the subjects addressed in the infographics.

The use of infographics as an integrated unit for presenting extensive or intricate material offers an advantage over textual content due to the relatively simpler cognitive processing involved in comprehending visual information compared to

processing written language. The processing of visual information is known to occur more rapidly compared to textual information, since it involves immediate engagement with the whole picture, whilst textual information is processed in a linear and sequential manner (Beegel, 2014). This finding aligns with the research conducted by Martin et al. (2019), which suggests that the use of infographics is more effective when used in conjunction with text-based awareness methods.

The Cognitive Theory of Multimedia also outlines a set of design guidelines aimed at facilitating the cognitive processes involved in infographic design. This phenomenon may be seen via the lens of spatial juxtaposition, which refers to the proximity of words and symbols inside the infographic, and the temporal juxtaposition, referring to the simultaneous presence of texts and symbols in the infographic. Furthermore, it is important to consider the idea of logical coherence, which involves organizing textual contents inside a framework of logical connections to effectively accomplish a certain objective (Li et al., 2015; Mayer, 2005).

3.2. Theoretical principles for enhancing foreign workers' awareness

The significance of raising awareness among foreign domestic workers during the COVID-19 crisis can be elucidated by the Social Exchange Theory. This theory emphasizes the need to establish equilibrium between an individual's efforts and the rewards they receive, be it in the form of moral or material incentives. It posits that individuals engage in reciprocal relationships, wherein they give with the expectation of receiving a favorable outcome (Cook et al., 2013). This theory may be used to enhance the knowledge of the COVID-19 epidemic among foreign domestic workers. In ordinary circumstances, domestic workers exhibit exemplary dedication to their duties, and at times of crisis, they need support and aid from others. Hence, the failure to provide support for domestic workers amidst the COVID-19 pandemic has implications for their sense of belonging within the family. Furthermore, the neglect of these workers at present may lead to various health issues for the entire household. Additionally, the inability of domestic workers to fulfill their psychological, social, and biological needs during the COVID-19 crisis may contribute to a state of dissatisfaction. Unemployment might lead individuals to engage in unfavorable conduct within their familial relationships.

In a pertinent context, Social Role Theory offers a rational justification for the significance of domestic workers conforming to all steps aimed at augmenting their knowledge pertaining to the COVID-19 epidemic. The social role theory is grounded in a series of assumptions that posit the individual as a member of a social organization. This organization is comprised of a complex network of individuals, whose relationships are characterized by stability and equilibrium. This equilibrium is achieved through the roles that each individual assumes within society, which entail a set of rights and obligations that are binding upon individuals (Koenig and Eagly, 2014). The application of this theory's data can be extended to the context of increasing the awareness of foreign domestic workers regarding the COVID-19 pandemic. This is due to the fact that foreign domestic workers are integral members of the family unit and are liable for various duties, including educational and social tasks. It is important to note that every role fulfilled by domestic workers is mandatory

and must be executed, irrespective of the level of effort exerted. Hence, it is imperative for domestic workers to assume the responsibility of promoting health awareness amidst the COVID-19 pandemic. They should diligently engage with all available awareness materials to ensure optimal levels of physical and psychological well-being for both them and their entire household.

Given the potential for significant tensions and stresses arising from the COVID-19 epidemic, it is imperative that foreign domestic workers be provided with a range of awareness training (Liem et al., 2020). In this regard, the idea of cognitive dissonance might be used as a useful framework. This paper aims to provide a theoretical explanation for the necessity of awareness programs regarding the COVID-19 pandemic for foreign domestic workers. The theory of cognitive dissonance posits that individuals are motivated to achieve cognitive harmony, which occurs when there is a balance between their cognitive structure and the information they encounter. However, when individuals are exposed to stimuli that contradict their existing cognitive structure or information, a state of cognitive dissonance arises when a person encounters a stimulus that contradicts their cognitive structure or existing knowledge, leading them to engage in behaviors aimed at achieving cognitive consonance. Cognitive dissonance refers to a psychological state characterized by a perceived inconsistency or conflict between one's beliefs, attitudes, or behaviors. This state may induce a sense of vulnerability and subsequently impact an individual's efficacy and productivity, hence prompting more investigation and study. The present study aims to explore the many strategies and approaches that might potentially mitigate the occurrence of cognitive dissonance (FitzGerald et al., 2013; Harmon-Jones and Harmon-Jones, 2012). At this point, it can be argued that the COVID-19 pandemic exerts significant pressures and tensions on foreign domestic workers, potentially leading them to experience cognitive dissonance. Consequently, they may actively seek out physical and mental health information as a means to attain a sense of well-being and mental stability amidst the profound impact of the pandemic.

4. Materials and methods

4.1. Approach

The study utilized a quasi-experimental methodology (Gopalan et al., 2020), to investigate the correlated association between the independent variable of digital infographics and the dependent variable encompassing cognitive, performance, and psychological awareness of the COVID-19 pandemic. The present study additionally used a descriptive technique throughout the phases of investigation, analysis, design, and development of the COVID-19 pandemic awareness scale.

4.2. Experimental design

A two-group experimental design was employed, with the first group using digital infographics and the second group relying solely on text awareness messages sent by the Ministry of Health over round phones. **Table 1** illustrates the experimental research design implemented in this study.

Table 1. Experimental research design.

Groups	Independent variable	Dependent variable
Experimental group 8 domestic workers	Infographics	Awareness of the COVID-19 pandemic
Control group 8 domestic workers	Regular awareness messages via mobile phones	

The quasi-experimental method has been implemented in the current research to reveal the relationship between the following variables:

- Independent variable: Digital infographics.
- Dependent variable: Awareness of the cognitive, performance, and psychological aspects of the COVID-19 pandemic.

4.3. Sample

Survey sample: The purpose of this survey sample is to assess the psychometric features of the COVID-19 pandemic awareness scale in the context of ongoing research, as well as its appropriateness for use in the selected study sample. The group in question included (7) foreign domestic workers who had an elevated level of proficiency in the English language. Specifically, this group was located in the city of Jeddah and consisted of (3) housekeepers and (4) drivers. The mean age of the participants was 29.27 years, and the standard deviation was 1.1.

The fundamental example: The group consisted of (16) foreign domestic workers, comprised of (8) housekeepers and (8) drivers, all of whom have an elevated level of proficiency in the English language. The mean age of the group was 28.05 years, with a standard deviation of 1.04. The participants in the study were assigned to groups using a random distribution method. The participants were placed into two distinct groups: the experimental group and the control group, each consisting of (8) participants.

4.4. Measures

Based on a comprehensive examination of existing scholarly literature and prior investigations focused on the development of metrics to gauge awareness of the COVID-19 pandemic (Roy et al., 2020; Zhong et al., 2020), the research team has discerned three dimensions of pandemic awareness. These dimensions encompass cognitive awareness of the COVID-19 pandemic, performative awareness of the COVID-19 pandemic, and psychological awareness of the COVID-19 pandemic, as evidenced in the currently available literature. Considering the fundamental dimensions and the objective of the scale, the statements of the scale were constructed in such a way that it comprised a total of (30) statements. These dimensions include the cognitive awareness dimension with (12) statements, the performative awareness dimension with (8) statements, and the psychological awareness dimension with (10) statements. The correction scores for the scale were estimated by assigning a value of one point for each affirmative response and (0) points for each negative response to the items on the scale. The total score for the scale was determined to be (30) points. The Cronbach alpha technique was used to determine the reliability coefficient of the scale, based on a sample of (7) domestic workers. The reliability of each dimension was computed individually, resulting in reliability coefficients ranging from 0.76 to

0.81. All of these coefficients were found to be statistically significant at the 0.01 level, suggesting that the scale may be considered reliable with a satisfactory level of confidence. In another method of measuring stability, the scale was applied to the survey sample, before and after, with an interval of two weeks, and the research team calculated the values of the correlation coefficients for the three dimensions of the scale, and the total score, and the Pearson correlation values were as follows: Cognitive Awareness (0.81), Performance Awareness (0.79), Psychological Awareness (0.83), and the total score (0.81). After completing the scale in Arabic and ensuring its reliability, the scale was translated into English, as it is the intermediate language in which the sample members agreed to communicate, and only those sample members who are fluent in English were selected.

4.5. Procedures

In order to ascertain the specific types of domestic workers suitable for illustrating research experience, we initiated communication with a labor recruiting agency situated in the city of Jeddah. The study findings indicate that the types of domestic workers that have the highest levels of reliability are those engaged in domestic service and chauffeuring. An exploratory investigation was undertaken on a sample of (35) domestic workers, in which contact was made with the heads of the households employing these workers. The study disclosed that not all participants in the sample had fluency in the Arabic language; (16) individuals were identified as female, while (19) individuals were identified as male. Moreover, a significant majority of 85.71% exhibit proficiency in reading and writing skills of the English language. The age range of the individuals in question spans from 23 to 36 years. The period of their residence varies from a minimum of a year to a maximum of seven years. All participants in the study (100%) own mobile phones, with a majority (91.42%) using the WhatsApp application. Furthermore, a considerable proportion (82.85%) of the individuals surveyed reported being granted permission by the heads of their respective households to use wireless Internet at home. Moreover, a significant majority (71.43%) of the domestic workers demonstrated their willingness to participate in the research study. A majority of the heads of families (86.71%) consented to the inclusion of their sponsored individuals in the trial. Based on the above analyses, individuals were chosen as sample participants if they had a minimum job experience of two years in the Kingdom, had mobile phones, shown proficiency in using WhatsApp, and enjoyed unrestricted access to home Internet services. Furthermore, the scope of the study was restricted only to participants who had an elevated level of proficiency in the English language. Consequently, a total of (7) domestic workers were assigned to the exploratory sample, whereas (16) were assigned to the final trial.

With regards to the objectives pertaining to the enhancement of cognitive, performance, and psychological awareness, the focus of the material was centered on a series of (18) infographics. These infographics were designed to facilitate the improvement of cognitive abilities, performance levels, and psychological awareness. The infographics that were chosen for this study were derived from primary sources and were specifically confined to infographics that were officially released by the

World Health Organization and the Saudi Ministry of Health. A total of (6) infographics were assigned for each dimension of awareness. The provided infographic considered the following factors:

- Each infographic addresses a certain cognitive element.
- The concept is associated with the indications of the awareness scale that was established.
- The text includes words or expressions that pertain to subjects or occurrences associated with the COVID-19 pandemic.
- There exists a discernible correlation and interdependence among the data shown in the infographic.
- The infographic presents information in a hierarchical manner, with the most general information positioned at the top and then followed by less generic information.
- The content comprises a harmonious combination of textual elements and visual representations.

The purpose of this interaction is to facilitate the engagement of domestic workers with the informational content presented in the infographic. The infographic encompasses diverse visual depictions pertaining to the COVID-19 pandemic. Moreover, domestic workers are able to interact with the infographic using the available tools within the WhatsApp application. These tools enable them to manipulate the size of the infographic, provide comments, and subsequently share the infographic with the original sender.

The purpose of the feedback is to assess the workers’ perspectives on the infographics, subsequently providing voice comments from the workers to address their queries or elucidate certain topics (Khan et al., 2022). An agreement has been reached with the workers about the feasibility of using WhatsApp as a platform for transmitting voice remarks in English. This will serve as a means to address their queries and provide confirmation (Stonbraker et al., 2020). The participants in the study said that the most suitable time for daily contact was from 7:00 pm to 9:00 pm, during which they engaged in communication activities for a duration of two hours. The research experiment was carried out in Jeddah in April (1–22 April 2020) during the COVID-19 crisis.

5. Results

The first experimental group that used the infographic technology and the control group that used text awareness messages had to be compared in order to confirm the validity of the hypothesis and provide an answer to the first question about how effective infographics were in raising pandemic awareness. The Mann-Whitney test was used to determine significant differences between the two groups, as shown in **Table 2**.

Table 2. The Mann-Whitney test, during the post-measurement of the COVID-19 pandemic awareness scale.

Group	No	Average rank	Total rank	Value(U)	W	Z	Significance value
Experimental group infographic	8	12.50	100.00	5.00	36.00	3.38	0.000
Control group awareness text messages	8	4.50	36.00				

The results shown in **Table 2** indicate the presence of statistically significant disparities between the experimental group, which used the infographic approach, and the control group that only utilized conventional communications. These differences consistently favored the experimental group that employed the infographic technique. A statistically significant difference was observed at a significance level of ≥ 0.05 in the average awareness levels between the experimental group, which utilized the infographic technique, and the control group, which received regular awareness messages from the Ministry of Health, during the post-measurement phase as a result of the impact of infographic technology. The observed outcome may be attributed to the impact of using the infographic approach, which was shown to be advantageous for the experimental group. The result shown in the table above indicates the superiority of the experimental group that used the infographic as the infographic was able to present interesting and timely information. The infographic included attractive colours, readable fonts, and dividing lines between different information, which enhanced awareness of the COVID-19 pandemic. The reliance of each infographic on a basic storyline and a single theme or main idea resulted in the experimental group outperforming the control group in deep awareness of the COVID-19 variants. The fact that seeing an infographic is not only seeing colours, but also how to share the infographic and manage discussions about it until all aspects of understanding are complete, contributed to clear differences between the experimental group and the control group. The impact size was computed, revealing that the effect size value for the use of the infographic approach on the study sample in terms of COVID-19 pandemic awareness was determined to be 0.522, indicating a substantial effect size. **Figure 1** illustrates the disparity in mean rankings between the experimental group and the control group.

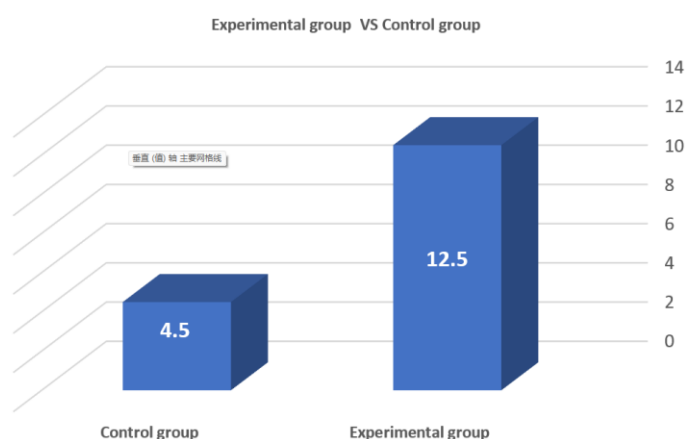


Figure 1. The difference between the experimental group and the control group.

6. Discussions

The primary objective of this study was to assess the efficacy of infographic technology in augmenting the level of knowledge among foreign domestic workers on the COVID-19 epidemic. The results have already shown the effectiveness of infographics in improving the awareness of foreign domestic workers. The observed outcome might perhaps be attributed to the use of symbols and forms in infographic technology. These elements were employed to effectively communicate the intended

message of the infographic, while minimizing the inclusion of detailed graphics that may overwhelm the cognitive load of processing the information. The design of infographics aims to eliminate extraneous elements that may divert individuals' attention away from the content, thereby facilitating a clear presentation of scientific facts and ideas. This approach ensures a balanced cognitive effort and undoubtedly contributes to a comprehensive understanding of the effectiveness of infographics in raising awareness about the COVID-19 pandemic.

The use of infographic technology has significantly facilitated the expeditious dissemination of information, resulting in time and resource conservation. Furthermore, the use of infographic technology has not only resulted in an augmentation of comprehension, but it has also facilitated enhanced retention and comprehension. This is achieved by the creation of auditory sensations and mental imagery via the visual depiction of all cognitive, performance, and behavioral information of COVID-19 pandemic. The achievement of these outcomes was facilitated by directing the use of the infographic method on certain parts within the picture that do not impose substantial cognitive demands on the participants while processing COVID-19-related information in their working memory. Consequently, the individuals within the sample have shown a strong commitment to the activities of digesting, envisioning, and comprehending the interconnections among the many elements, whether textual or graphical in nature and with regards to the COVID-19 pandemic theme. The observed outcome, which demonstrates the efficacy of infographics in raising awareness about the COVID-19 pandemic, can also be ascribed to the motivating effect of infographic technology on the participants. This motivation prompted them to actively engage in various activities to comprehend the remaining information presented within the infographic. However, this engagement facilitated the acquisition of valuable experiences for the individual sample of foreign domestic workers. The use of cognitive schemas facilitated the acquisition of novel experiences by storing them in long-term memory. Furthermore, the use of infographics in interactions places a cognitive burden on individuals that is intimately tied to the subject matter. These activities are intrinsic, beneficial, or intricately linked to the process of obtaining information pertaining to the COVID-19 pandemic. The process of building cognitive schemas in long-term memory is beneficial since it enables individuals to effectively learn information.

The present findings align with the principles of Gestalt principles, which suggest that efficiency is derived from simplicity. This is due to the reduced internal stress experienced by individuals when perceiving the simplest form. Consequently, the shapes pertaining to COVID-19 within the infographic can be assimilated without inducing any stress. The comprehension of the internal components and the lines that depict the forms aids people in gaining a holistic grasp of the symbolic representation of these shapes (Chang et al., 2002).

According to cognitive load theory, the strategic decision to concentrate the visuals just on the essential parts pertaining to COVID-19, while excluding extraneous features that may not be necessary for the individual, resulted in a reduction of cognitive load and enhancement of knowledge acquisition processes (Kalay and Marx, 2005). The findings of this study align with the principles of Constructivism Theory, as the use of simplified infographics facilitates an active process of knowledge

construction. Through this process, individuals are able to actively engage in acquiring knowledge and developing cognitive flexibility, enabling them to create organized plans (Serenelli et al., 2011).

The current result is consistent with the Stimulus Generalization Theory, which suggests that stimuli that attract individuals' attention within infographics prompt domestic workers to engage in behaviors that are represented by these stimuli. Thus, the reliance on infographics has significantly contributed to the generalization of positive concepts related to dealing with the COVID-19 pandemic. According to Cognitive Theory of Multimedia, the integration of text and visuals within infographics has effectively achieved the principles of spatial juxtaposition, temporal juxtaposition, and logical juxtaposition, thereby significantly enhancing the impact of the message conveyed by the infographic. This has resulted in presenting the message within a concentrated framework of focus, allowing individuals from the sample of domestic workers to acquire a comprehensive understanding of the concepts related to the COVID-19 pandemic.

The Social Exchange Theory posits that individuals have a continuous desire to receive incentives based on their performance. This theory offers a compelling rationale for elucidating the efficacy of infographics in augmenting cognitive awareness of the COVID-19 pandemic among the selected population of foreign domestic workers. This is due to the fact that the domestic workers, with the support of the family heads who sponsor them for the experiment, perceived that educating them about the COVID-19 pandemic and providing care for them constitutes a significant moral incentive for their efforts. Additionally, they felt that being supported by caring individuals enables them to feel a sense of belonging and significance. Society was thus keenly intrigued by infographics, which endowed them with a profound understanding of the psychological, cognitive, and performance facets of the COVID-19 pandemic. As per the principles of Social Role Theory, it is possible to deduce from its content that foreign domestic workers constitute a significant element of the family unit and are entrusted with certain responsibilities and roles. These include being aware of the psychological, performance, and cognitive significance of the COVID-19 pandemic, as well as adhering to all measures that safeguard the family against potential hazards. The general situation caused by the COVID-19 pandemic has, according to the Cognitive Dissonance Theory, induced a state of healthy cognitive dissonance among domestic workers regarding the information they have and what they ought to know to avoid this pandemic. As a result, domestic workers have resorted to Infographics represent a potential remedy for mitigating cognitive dissonance and providing individuals with information that can instill a sense of well-being and psychological stability amidst the profound repercussions of the pandemic.

The findings of the present investigation align with those of numerous studies that have underscored the significance of infographics in health awareness initiatives, including Siricharoen (2015) research, which substantiated the efficacy of infographics in augmenting public awareness regarding health concerns. Additionally, the research conducted by Chicca and Chunta (2020) illustrated how infographics can be a valuable tool in simplifying intricate medical information. Furthermore, the research conducted by Martin et al. (2019) illustrated the superior efficacy of infographics in health awareness initiatives when compared to textual tools. According

to a study by Locoro and his research team (Locoro et al., 2017), infographics are among the most effective methods for raising awareness about issues that affect the daily lives of individuals. Accordingly, it is necessary to expand the use of educational and digital technologies that can be relied upon to improve awareness during emergencies (Abd El Bakey et al., 2023; Al-Hafdi and Alhalafawy, 2024; Al-Nasheri and Alhalafawy, 2023; Alanzi and Alhalafawy, 2022a, 2022b; Alhalafawy et al., 2021; Alhalafawy and Tawfiq, 2014; Alhalafawy and Zaki, 2022; Alhalafawy & Zaki, 2019; Alshammary and Alhalafawy, 2022, 2023; Alzahrani and Alhalafawy, 2023; Alzahrani and Alhalafawy, 2022; Alzahrani et al., 2023; Alzahrani et al., 2022; Najmi et al., 2023; Zeidan et al., 2017; Zeidan et al., 2015).

7. Limitation

The study sample has been limited to those employed as domestic helpers who had just a competent level of English language proficiency, ensuring a consistent and cohesive communication within the messages. In the future, there is potential for the further application of procedures within an environment that accommodates multilingualism, specifically tailored to the needs and classifications of domestic workers. The application of the intervention was limited to a small sample size of (8) individuals in each group. This was mostly owing to challenges encountered in recruiting a larger number of domestic workers, which were attributed to factors such as obtaining agreement from families or the participants themselves. In the future, there is potential for the expansion of application activities to include a considerable number of domestic workers.

8. Conclusions

The importance of current research is based on identifying appropriate mechanisms for using infographics during emergency situations for the purpose of enhancing awareness. The current research is centered on the documentation of an empirical investigation that used infographics as a means to enhance public awareness about foreign domestic workers during the COVID-19 outbreak. The study identified a framework for the use of infographics in the context of an ongoing pandemic. The aforementioned context is associated with the need for infographics to align with the specific attributes of domestic workers, as well as the dissemination of infographics within a conducive setting that facilitates interaction. The identification of key markers to assess knowledge of the COVID-19 pandemic has been categorized into three fundamental dimensions: cognitive, performative, and psychological awareness. The practical implications of this research contribute to the advancement of endeavors focused on increasing the utilization of infographics within the framework suggested by research on promoting awareness in emergency and crisis situations. Stakeholders stand to gain advantages from the findings of ongoing research pertaining to the reconfiguration of awareness messages in the context of emergencies and crises. Subsequent research endeavors may center on the comparative analysis of various infographic styles in their efficacy to enhance public awareness in the context of diverse emergencies and crises. Additionally, it is feasible to assess the efficacy of infographics on individuals with diverse cultural backgrounds. The examination of the

use of infographics in gamification-based settings may also be addressed.

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Institutional review board statement: Ethical review and approval were waived for this study because it was carried out with the informed consent of workers aged 18 and above. The study's experimental treatments do not present any possible risks to health. workers are permitted to resign from the study at any time and their participation is entirely voluntary. The privacy of every participant in the investigation was maintained.

Informed consent statement: Informed consent was obtained from all subjects involved in the study.

Data availability statement: The raw data supporting the conclusion of this article will be available upon request to the corresponding author.

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