Original Article

Language As A Barrier In Health Care Communication-A Comparative Study On Rural And Urban Hospitals

Rituraj Taye[1*], Archana Paswan[1], Desh Deepak Singh[2] Mansi Kapil[1], Shruti Sharma[1], Vanika Choudhary[1], Jagdish Prasad[3], Govind Pareek[4]

[1]Amity School of Communication, Amity University Rajasthan, Jaipur, India.
[2]Amity Institute of Biotechnology, Amity University Rajasthan, Jaipur, India.
[3]Amity School of Applied Science, Amity University Rajasthan, Jaipur, India.
[4]Joint Director- Public Relations, Govt. of Rajasthan Jaipur, India.

***Corresponding Author: -** *Rituraj Taye, Amity School of Communication, Amity University Rajasthan, Jaipur, India
E-mail: rituraj.taye63@gmail.com
DOI: 10.47750/pnr.2023.14.S02.271

Abstract

Communication is the key tool to success. When it comes to healthcare communication, there is a vast gap between medical professionals and patients especially people with a lesser education and people belonging to rural areas. Communication is very much essential in providing quality medical care and content to patients. The effect of the languages and the scientific terms used by medical professionals becomes difficult for the common audience to understand; hence, the understanding gap also increases. This study demonstrates how language becomes a hurdle in healthcare communication depending on the location or locality of the hospital. The main objective of this research paper is to find how language becomes a barrier in health communication depending on the location of the hospital and the communication challenges experienced by rural and urban audiences in hospitals. It will also focus on how infographic designs can help the audience in reducing the communication gap in understanding healthcare information. We have collected 300 samples from 20 different hospitals from both Rural & Urban areas of Jaipur-I City, Rajasthan India. The paper also highlights some of the challenges posed by the language barrier and recommends a few suggestions. This research finding indicates that the language barrier in health communication can be minimized with the use of infographic designs for communication with the audience.

Keywords:- Healthcare, Infographics, Designs, Communication, Chi-Square Test.

INTRODUCTION

From prehistoric times to the medieval era and up to the present, the language of information design has shared characteristics that have facilitated communication within the evolution of humanity. Cleveland (1994) describes that information is represented in visual forms, and the human brain is better able to recognize and understand links and patterns. Smiciklas (2012) describes an infographic as a visualization of data or ideas that tries to convey complex information to an audience in a manner that can be quickly consumed and easily understood".

Fast communication relies on senses and emotions, such as seeing images (Barry, 2004). Clear communication is achieved through language and logic, and the same applies to text (Chowdhary, 2020). A picture can depict a story and it makes it more comprehensible compared to a lot of written words. A well-known phrase "A picture is worth a thousand words" (Pinsky et al., 2000) is a proclamation about the importance and effectiveness of visual communication. (Smiciklas, 2012). When information is represented in visual forms (Kosslyn, 1977), the human brain's capacity is more adept at identifying and comprehending connections and patterns. (Cleveland, 1994). A good infographic conveys to the reader a story (Siricharoen, 2003), and persuades the people to read the information just like some good headlines and pictures may attract a reader (Siricharoen, 2013). Infographics (Information + Graphics) are a creative and effective way to present any information visually simply and clearly. Lurie and Mason (2007) mentioned that any information that is represented visually improves our knowledge and decision-making capacity. Infographic is an abbreviated term for an information graphic (Scott et al., 2016). Information is presented logically, like storytelling by using data visualizations, text, and pictures (Kosara & Mackinlay, 2013). Information graphics, also known as infographics, are used to visually communicate information and data accumulations. (Balkac & Ergun, 2018). Infographics are described as a way of simplifying and making information understandable, just by visualizing the information (Yuvaraj, 2017). The main goal is to easily convey complex and in-depth information (Alpert et al., 2016) by considering the substance of the subject to the intended audience (Lowe, 1993).

Infographics in Health Care

According to Balkac and Ergun (2018), infographics are effective digital tools in the healthcare industry that give patients the knowledge they need to grasp details about certain conditions, treatments, and hot topics in the field. In other words, infographics should be creative and made to help patients learn crucial information (McCrorie et al., 2016). Communication with the health patient is very important, especially in the case of a person visiting a hospital for various medical purposes (Markides, 2011). Informational graphics have a more potent impact, stress the connection between two fields, such as graphic design and health, and can educate patients during formative stages, according to research (Balkac & Ergun, 2018). The infographics are crucial for patients and can help in developing disease-enabling strategies (Greenhalgh et al., 2020). Infographics can help patients better grasp the causes of the dangers associated with a condition or disease. Communication is very much essential in providing quality medical care to patients (Balkac & Ergun, 2018). When it comes to healthcare communication, there is a vast gap between medical professionals and patients especially in understanding the complex scientific terms or the diseases described by the doctor during treatment (Cass et al., 2002). The effect of the language and the scientific terms used by medical professionals becomes difficult to understand at times (Barker et al., 2009).

According to Taye and Paswan (2019), the human brain can remember 80% of visual information compared to 20% of text. Infographics often communicate health messages to target audiences more effectively than plain text does. When it comes to healthcare, 40% of individuals prefer visual information to plain text. According to Balkac and Ergun (2018), infographics are crucial for patients and should be created with a specific objective in mind.
Infographics containing visual representations of facts, knowledge, or information can convey information swiftly and clearly, according to Taye et al. (2022). Infographics are highly helpful in educating patients for a better grasp of the procedures and pathological aspects of their diseases. Complex health information may be easily presented to the public through a variety of mediums. Infographics are used frequently in the healthcare sector by businesses and professionals to directly communicate medical information to patients.

India is a diverse country with many different cultures and dialects (Pattanayak, 1985). The education level of the population also varies with the geographic location. When a visitor visits a hospital, there are numeric signage systems that are used for directing the visitors to go to the respective departments (Gibson, 2009). This signage is a pictogram that indicates the respective departments (Rousek & Hallbeck, 2011). For example, a patient with an eye infection who visits the hospital for eye care can go directly to the department of Ophthalmology without seeking any help just by understanding the sign of the “Eye” used for Ophthalmology. But sometimes the pictograms are difficult to understand due to their similarity and thus the chance of being misunderstood by the viewer is inevitable (Soares, 2013).

Types of information a healthcare infographic can inform the public

Kouri (2017) explains that a healthcare infographic can be used for multiple purposes in informing the audience regarding healthcare in various formats across multiple platforms. The issues can be related to the causes and risks related to diseases or conditions. VanderMolen and Spivey (2017) mentioned that infographics can also be used to present information about various healthcare topics, about a specific disease and its processes, symptoms and treatments process, prevention, and actions to be taken during the spread of diseases or pandemics.

Pérez-Lu et al. (2018) describe the reason for better health information is due to the reliable and timely health information provided to the public through attractive and informative infographics. Health infographics can effectively convey vital facts and even challenge viewers to alter their perspectives (Scott et al., 2016). It can improve the ability of people to grasp health information and help to enhance the patient’s decision-making capabilities (Nutbeam, 2008), and improve the relationship between the patient and practitioner, thus building a bridge between the laymen and healthcare professionals (Palumbo, 2016). Additionally, it can help patients to understand the risks or causes associated with a sickness or condition by informing them about numerous procedures and pathological situations (Bruce et al., 2022).

A healthcare infographic's major objective is to empower individuals to make more educated decisions regarding their health (Katz & Hawley, 2013). Carefully selecting the visuals in infographics is the most important decision to motivate the patients and improve patient education efforts (Marcum, 2002). Infographics can alter patient behavior with better images, according to Provvidenza et al. (2019), who also discuss how to overcome learning barriers and tailor visuals to patient types. Patient education refers to the process of altering a patient's behavior and fostering the information, attitudes, and skills necessary to preserve or improve health (Rankin, 2005). Patient education materials should motivate patients to change their behavior for the better and go above and beyond to start meaningful interactions (Bandura, 2004). Ocampo (2019) describes infographics as one of the most powerful ways to communicate complex data. When it comes to health care, the information becomes complex to understand especially the scientific terms or the diseases. People with lesser education find it very difficult to communicate with medical experts and to understand the communication system inside the hospital due to the language barrier. Medical experts need to explain the diagnostics or the symptoms of the diseases

with infographic visuals for better understanding both in rural and urban hospitals. Currently, many private and government hospitals have started using infographics to display complex information to the general audience. It is a very powerful tool that can convey any message to the public because the information is presented in a simpler way along with a graphical representation related to it, as shown in Figure 1.

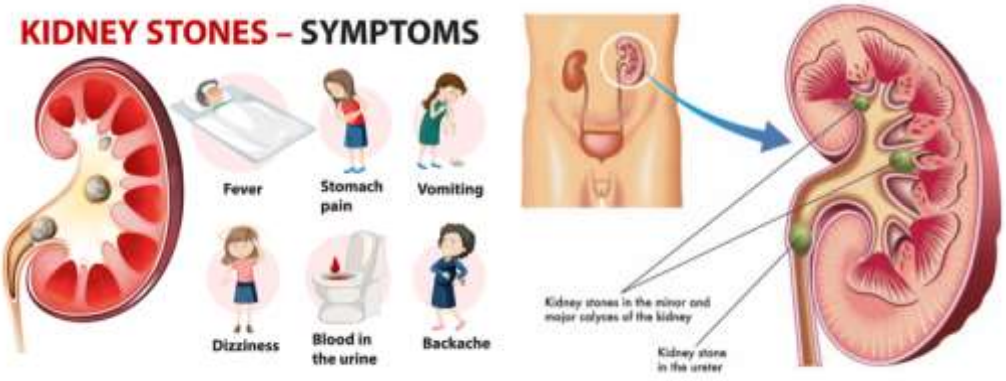

Figure 1: Figure of infographic image displaying kidney stone and its symptoms.

METHODOLOGY

To fulfill the objectives, we have conducted Quantitative Research and a survey method on 300 people comprising health care professionals, patients, and the public. Questionnaires were developed to identify, select, and analyze the information about the language barrier in healthcare communication and the challenges experienced by both the rural and urban audiences while visiting the hospitals for various purposes. It also focuses on how infographic designs can help the audience in reducing the communication gap in understanding healthcare information that is displayed in hospitals.

We developed a questionnaire using the 5-Point Likert Scale to obtain the objectives. The research items that were developed for the survey are:

1. Language becomes a barrier in health care communication depending on the location or locality of the hospital situated.
2. Doctors explaining the cure of the diseases with an infographic image or visuals becomes easier for the patient to understand the symptoms and the curing process.
3. Text with Visual Illustration is easier to understand than information containing only text.

Hypothesis

From the collected data, we will test the Hypothesis and find out whether language act as a barrier in healthcare communication or not depending on the location of the area and hospitals. The hypothesis is as follows:
"To find out the association between Area (Rural-Urban) and language barrier".

Data Collection

To collect the data from the 20 mentioned hospitals, data collection tools were used in the survey. These tools help us in getting the specific data required to fulfilling the objectives and prove the hypothesis. Based on the location, the data collection tools were beneficial in acquiring the data.

The following four data collection tools were used in the survey:

1) Observation Method: In the observation method we studied the various infographics designs that are used in the healthcare sector and study the designing process and the presentation style of the infographics which help us to know the understanding level of the audiences and the impact created.
2) Interview method: In the interview method, we conducted an in-depth interview with the healthcare experts, patients, and visitors visiting the hospital. We interview them about the infographics used, pictograms, posters, flyers, and banners used in the hospitals and find out how much they understand by visualizing them.
3) Collection of data through questionnaires: Through questionnaires, we collected 300 data from the selected 20 hospitals. The questionnaire was designed using the 5-point Likert Scale fulfilling the objectives of the research.
4) Discussions: Through discussions with healthcare experts, we found out how the use of infographics helps in reducing the communication gap between rural and urban hospital visitors.

For the survey, we have selected 20 different hospitals comprising both private and government hospitals in the Jaipur-I City of Rajasthan, India. Further, we have categorized the zone of the hospitals so that the data collection is specific. From the rural areas, we have selected 4 Primary Health Centers (PHCs), 3 Community Health Centers (CHCs), and 3 SubCenters and from the Urban areas, we have selected 5 private and 5 government hospitals which are shown in the table below.

List of the selected hospitals	
Hospital Location	**Hospital Type**
Achrol	Primary Health Center
Chanwaji	Primary Health Center
Tala	Primary Health Center
Dhoula	Primary Health Center
Manoharpur	Community Health Center
Amer	Community Health Center
Bhanpur Kalan	Community Health Center
Kant	SubCenter
Kukas	SubCenter
Bilochi	SubCenter
S. M. S. Hospital	Government Hospital
Bani Park Hospital	Government Hospital
SR Goyal Hospital	Government Hospital
ESI Model Hospital	Government Hospital
Government Satellite Hospital	Government Hospital
NIMS Hospital	Private Hospital
Fortis Escort Hospital	Private Hospital
Saket Hospital	Private Hospital
Maxwell Hospital	Private Hospital
Metro Hospital	Private Hospital

Table 1: Table shows the list of selected private and government hospitals of Jaipur-I City, Rajasthan for the survey.

During the observation period, we analyzed more than 20-30 healthcare infographics that were used in the selected hospitals. One common observation during the survey was that most of the healthcare infographics used in the Government hospitals (both rural and urban) were similar since it is provided by the Government of Rajasthan. And the text used in most of the infographic designs was Hindi literature and very few designs were in English literature. They also displayed a few health-related infographic posters provided by different healthcare organizations in Jaipur-I city. Whereas in the urban hospitals, most of the private hospitals displayed health infographics with contents in both Hindi and English literature. The images below show different healthcare infographics displayed in rural and urban hospitals.

Figure 2: Healthcare infographics displayed in the selected rural hospitals.

Figure 3: Healthcare infographics displayed in the selected urban hospitals.

During the interview process, we question the visitors visiting the hospitals regarding the healthcare infographics displayed in the hospitals which are also shown in Figure 2. Out of 150 participants, 75 of the participants could read and understand the health infographics displayed in the hospital, 60 participants could only understand the health infographics and interpret the meaning of the image displayed but cannot read the text, and lastly, 15 of the participants could neither read nor understand the health images displayed in the hospitals.
In the urban hospitals, 90 of the participants could read and understand the health infographics, 7 participants could only understand the health infographics and interpret the meaning but cannot read the text and 13 of the participants could neither read nor understand the health images displayed in the hospitals.
We also interviewed the visitors with the infographic poster which is shown in Figure 4. In the first image shown, we can see an image representation of a woman with a baby in her arms and work. The overall information is to provide a message to the public, about how a woman should hold and position the baby comfortably during any household work and the necessary support to be provided for the baby. This graphical representation was found in one of the rural hospitals. We ask the female participants about the visuals who were present in the hospital. Most of them answered that it is about a woman doing household work and holding a baby. Most of them could not interpret or read the text because of the language barrier. From the interview, we also found that the message shown in the infographic poster is half-informed because the design is not presented in a precise manner as mentioned in the poster. We also analyze the visual and found that the design does not carry or convey the exact messages, and this usually happens when the designer performs some random design without knowing who the audience is. This creates a gap between the poster design and the audience, ultimately leading to a communication gap between health information and the public.

Figure 4: An Infographic poster of a woman with baby care tips and breastfeeding positions.

Regarding the second image in Figure 4, most of the female participants in the rural hospital could not read the text because of the English literature, but they could easily interpret the image and the exact meaning of the poster. Most of the female participants could easily describe the meaning of the image just by looking at it and without even reading the text. This shows that if the information's shown in a sequence and meaningful way, it becomes much easier for the audience to understand. In urban hospitals, most of the participants could read and interpret the exact meaning of the infographic poster except for a few participants.

In Figure 5, we can see a graphical representation of human embryological development in different stages. Each graphic is accompanied by text mentioning the details of the stages. This graphical representation was used in one of the urban Government hospitals for explaining the stages of human embryological development. On being asked, about the graphical representation, most of the female participants who came to consult the medical expert could not understand the text written due to the language barrier as it was in the English language, but they could easily understand the graphics displaying the stages of human reproduction and it has facilitated the urban women in understanding the causes or risks related to human embryological development.

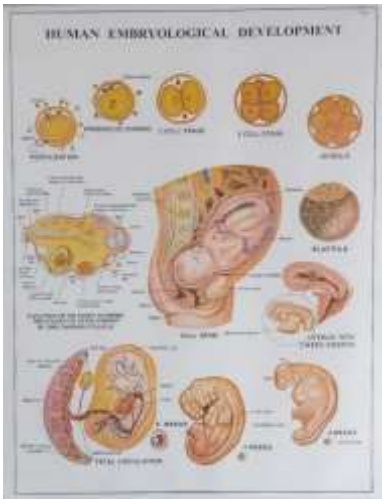

Figure 5: Infographic representation of human embryological development in different stages.

We also interviewed the female participants of the rural hospitals with the same infographic poster most of the female participants could not read the text because of the English literature but they could understand the different stages involved in the development of the human embryo cycle. This shows that health infographics can be used to make people understand health information when it is presented in a precise and meaningful way.

Analysis of the Data

For the analysis, we have identified 2 different Zones, i.e., Rural and Urban hospitals. There were 300 participants in the survey consisting of healthcare professionals, patients, and the public visiting the hospitals in the rural and urban areas of the Jaipur-I district. During the survey, there was active participation from the audience since the subject (Infographics) was presented to them and it was very interesting. The table and the graph below show the data of the participants from the rural and urban hospitals in response to the barrier of language in health care communication.

Zone	Agree	Disagree	Total
Urban	113	37	150
Rural	142	8	150
	255	**45**	**300**

Table 2: The table shows the data of the participants from the rural and urban areas.

From the above table, we can see that in the urban areas, out of 150 participants, 113 agrees that language becomes a barrier in healthcare communications and 37 participants disagreed. Whereas from the rural areas, 142 participants agreed, and 8 participants did not agree.

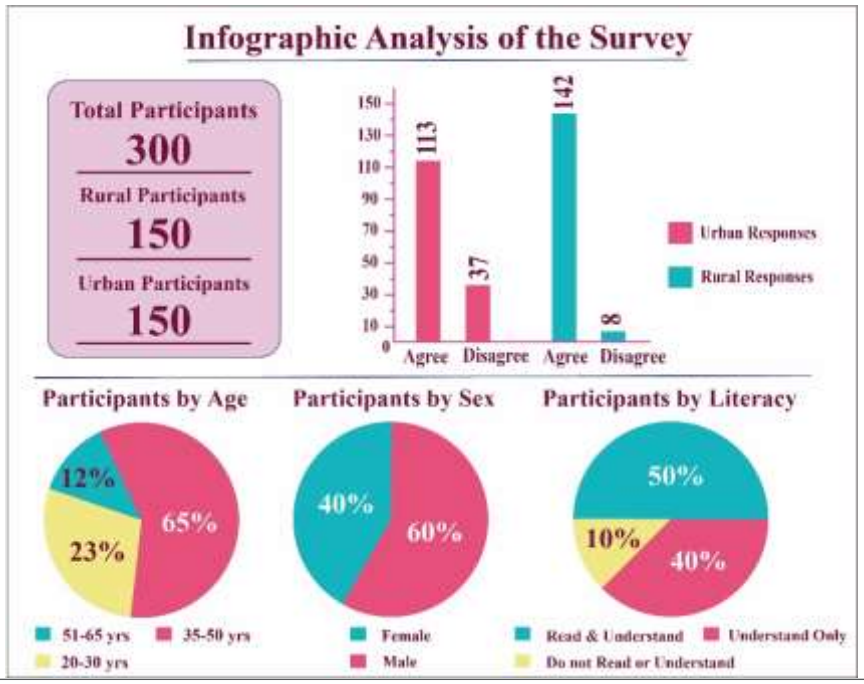

Figure 6: Figure shows the statistical data of the participants from the rural and urban hospitals.

From Figure 6, we can see that there were equal participants from both the rural areas and the urban areas. We also analyzed the participant's details concerning their age, sex, and literacy rate from both areas concerning the infographic images displayed in the hospitals. Out of the 300 participants, 65% belong to the age group 35-50 years and 23% each belong to the age group 51-65 years and 20-30 years. Concerning the male-female ratio, 60% were male participants and 40 were females from both areas. With regards to the literacy rate, 50% of the participants could read the text and understand the infographics images displayed in the hospitals. 40% of the participants could only understand and interpret the messages of the infographic images displayed but could not read the text. On the other hand, 10% of the participants could neither read nor understand the infographic images displayed in the hospitals.

From the 300-sample data collected, the Cross Tabulation of significant effects in the area (Rural & Urban) and the barrier of language in health care was calculated. In the cross-tabulation, we have taken the data from Rural areas (Agree & Disagree) and Urban areas (Agree & Disagree). To prove the hypothesis and find out the significant effect, we have applied Chi-Square Test to the Cross Tabulation.

Hypothesis Testing

To find out the association between Area (Rural-Urban) and language barrier the following hypotheses are to be tested.
H_o: There is no association between the area (Rural-Urban) and the language barrier.

H_1: There is a strong association between the area (Rural-Urban) and the language barrier.

For testing the above hypothesis, a Chi-Square statistical test is applied on SPSS Version 26 and the following results are obtained.

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	21.987[a]	1	.000		
Continuity Correction[b]	20.497	1	.000		
Likelihood Ratio	23.568	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	21.914	1	.000		
N of Valid Cases	300				
a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 22.50.					
b. Computed only for a 2x2 table					

Table 3: Table showing the Chi-Square Test of the rural and urban data collected on area vs language barrier.

From the above table, we find that the null hypothesis is rejected because the p-value of Chi-Square is 0.00 which is less than 0.05.
Hence, it is proved that there is a strong association between area (Rural-Urban) and language barrier. It is evident from the data that the agreement of language barrier is more in the rural area in comparison to urban areas.
The above hypothesis also fulfilled the main objective of the research paper in finding out how language becomes a barrier in health communication depending on the location of the hospital and the communication challenges experienced by rural and urban audiences in hospitals. From the above result, we recommend some suggestions which will be very much beneficial in the future healthcare communication system.

- Words are less likely to be recalled than visuals and pictures. It is widely established that visual information is more likely to be remembered and recognized than text or audio content. In some ways, the communal memory of a picture is more intricate, distinctive, and expressive than the collective memory of words (Hockley, 2008). Infographics improve concussion knowledge and preferences among different stakeholders, and it is quickly growing in popularity as a means of synthesizing and disseminating important data.
- Effective infographics are built on the principles of psychology, usability, graphic design, and statistics to lower obstacles (limited time, information overload) to understanding vital information. So, it plays a crucial part in bridging the information gap between information providers and information consumers. Since infographics use visual graphics and typography to represent large and complex information, there is frequent use of pictograms, pictures, photos, lines, and charts to illustrate the data. Infographics' use of visual components to display and convey data makes it easier for us to comprehend voluminous information. Learning with visual stimuli improves one's capacity for information processing and memory. Infographics bring value by expanding the research's comprehension and audience.

CONCLUSION AND DISCUSSION

Information graphics should be designed based on a specific goal. It can provide numerous insights which enable the public to understand information on various healthcare topics, specific diseases, and treatment procedures. Considering this, simple and perceptual images are always recommended while presenting any information on healthcare diseases. Only textual-based information may mislead the audience due to the language barrier or to people with lesser education, which is very common.

From the above study, we conclude that there is a language barrier in healthcare communication concerning the area and the locality of the hospital. We also saw that people can easily understand the information provided through graphics if well presented in a sequence. The images used should also convey the exact messages and meaning to the viewer in comparison to the text. There is a strong recommendation to include informative infographic designs for improving healthcare communication. Overcoming the language barrier needs to be prioritized and commitment must be made to implementing strategies that provide infographic information with regional languages depending on the location of the hospital. Otherwise, it might lead to misinformation due to the language barrier or people with lesser education.
Infographics also help people to understand data by using visual communication and help them recognize examples and trends. Infographics allow media companies to improve their operational procedures and core values. If the content is portrayed inadequately, the audience might be less affected by the message. Effective multimedia communications must be created to encourage meaningful learning, and computer-based multimedia learning offers a potentially significant avenue for improving and comprehending the audience.

REFERENCES

1. Alpert, J. M., Krist, A. H., Aycock, R. A., & Kreps, G. L. (2016). Applying multiple methods to comprehensively evaluate a patient portal's effectiveness to convey information to patients. Journal of medical Internet research, 18(5), e5451.
2. Balkac, M., & Ergun, E. (2018). Role of infographics in healthcare. Chinese medical journal, 131(20), 2514-2517.
3. Bandura, A. (2004). Health promotion by social cognitive means. Health education & behavior, 31(2), 143-164.
4. Barker, K. L., Reid, M., & Lowe, C. J. M. (2009). Divided by a lack of common language?-a qualitative study exploring the use of language by health professionals treating back pain. BMC Musculoskeletal Disorders, 10(1), 1-10.
5. Barry, A. M. (2004). Perception theory. In Handbook of visual communication (pp. 67-84). Routledge.
6. Bruce, I. A., Ezgü, F. S., Kampmann, C., Kenis, V., Mackenzie, W., Stevens, B., ... & Hendriksz, C. (2022). Addressing the need for patient-friendly medical communications: adaptation of the 2019 recommendations for the management of MPS VI and MPS IVA. Orphanet Journal of Rare Diseases, 17(1), 1-18.
7. Cass, A., Lowell, A., Christie, M., Snelling, P. L., Flack, M., Marrnganyin, B., & Brown, I. (2002). Sharing the true stories: improving communication between Aboriginal patients and healthcare workers. Medical Journal of Australia, 176(10), 466-470.
8. Chowdhary, K. (2020). Natural language processing. Fundamentals of artificial intelligence, 603-649.
9. Cleveland, W. S. (1985). The elements of graphing data. Wadsworth Publ. Co. https://dl.acm.org/doi/abs/10.5555/4084
10. Gibson, D. (2009). The wayfinding handbook: Information design for public places. Princeton Architectural Press.
11. Greenhalgh, T., Koh, G. C. H., & Car, J. (2020). Covid-19: a remote assessment in primary care. bmj, 368.
12. Hockley, W. E. (2008). The picture superiority effect in associative recognition. Memory & Cognition, 36(7), 1351–1359. doi:10.3758/mc.36.7.1351
13. Katz, S. J., & Hawley, S. (2013). The value of sharing treatment decision-making with patients: expecting too much?. Jama, 310(15), 1559-1560.
14. Kosara, R., & Mackinlay, J. (2013). Storytelling: The next step for visualization. Computer, 46(5), 44-50.
15. Kosslyn, S. M., & Pomerantz, J. R. (1977). Imagery, propositions, and the form of internal representations. Cognitive psychology, 9(1), 52-76.
16. Kouri, P., Rissanen, M. L., Weber, P., & Park, H. A. (2017). Competences in social media use in the area of health and healthcare. Stud Health Technol Inform, 232, 183-93.
17. Lowe, R. K. (1993). Diagrammatic information: Techniques for exploring its mental representation and processing. Information Design Journal, 7(1), 3-17.
18. Lurie, N. H., & Mason, C. H. (2007). Visual representation: Implications for decision making. Journal of marketing, 71(1), 160-177.
19. Marcum, J., Ridenour, M., Shaff, G., Hammons, M., & Taylor, M. (2002). A study of professional nurses' perceptions of patient education. The journal of continuing education in nursing, 33(3), 112-118.
20. Markides, M. (2011). The importance of good communication between patient and health professionals. Journal of Pediatric Hematology/Oncology, 33, S123-S125.
21. McCrorie, A. D., Donnelly, C., & McGlade, K. J. (2016). Infographics: healthcare communication for the digital age. The Ulster medical journal, 85(2), 71.
22. Nutbeam, D. (2008). The evolving concept of health literacy. Social science & medicine, 67(12), 2072-2078.
23. Ocampo, M. (2019). Why Infographics are Important? Naldz Graphics. Available from: http://www.naldzgraphics.net/tips/reasons-why-infographics-are-important/. [Last accessed on 2011 Nov 04].
24. Palumbo, R. (2016). Contextualizing co-production of health care: a systematic literature review. International Journal of Public Sector Management.
25. Pérez-Lu, J. E., Bayer, A. M., & Iguiñiz-Romero, R. (2018). Information= equity? How increased access to information can enhance equity and improve health outcomes for pregnant women in Peru. Journal of Public Health, 40(suppl_2), ii64-ii73.
26. Pinsky, L. E., & Wipf, J. E. (2000). A picture is worth a thousand words. Journal of general internal medicine, 15(11), 805-810.
27. Provvidenza, C. F., Hartman, L. R., Carmichael, J., & Reed, N. (2019). Does a picture speak louder than words? The role of infographics as a concussion education strategy. Journal of Visual Communication in Medicine, 1–12. doi:10.1080/17453054.2019.1599683
28. Rankin, S. H., Stallings, K. D., & London, F. (2005). Patient education in health and illness. Lippincott Williams & Wilkins.
29. Rousek, J. B., & Hallbeck, M. S. (2011). Improving and analyzing signage within a healthcare setting. Applied ergonomics, 42(6), 771-784.
30. Scott, H., Fawkner, S., Oliver, C., & Murray, A. (2016). Why healthcare professionals should know a little about infographics. British Journal of Sports Medicine, 50(18), 1104–1105. doi:10.1136/bjsports-2016-096133
31. Sinai M. Mount Sinai Infographics. Mount Sinai. [Last accessed on 2022 June 27]. Available from: http://www.mountsinai.org/about-us/infographics.
32. Siricharoen, W. V. (2013, May). Infographics: the new communication tools in the digital age. In The international conference on e-technologies and business on the web (ebw2013) (Vol. 169174).
33. Siricharoen, W. V. (2013). Infographics: an approach of innovative communication tool for e-entrepreneurship marketing. International Journal of E-Entrepreneurship and Innovation (IJEEI), 4(2), 54-71. DOI: 10.4018/ijeei.2013040104
34. Smiciklas, M. (2012). The power of infographics: Using pictures to communicate and connect with your audiences. Que Publishing. Pp. 199–224.

35. Soares, M. A. (2013). Legibility of USP pictograms by clients of community pharmacies in Portugal. International journal of clinical pharmacy, 35(1), 22-29.
36. Taye, R., Paswan, A. (2019). Usage of Infographics in Mobile Business in Promoting & Branding Healthcare in Social Media. IJRAR May 2019, Volume 6, Issue 2 (E-ISSN 2348-1269, P- ISSN 2349-5138)
37. Taye, R., Junaid, A., & Singh, D. D. (2022). A Qualitative Evaluation of Infographics and its Uses in Healthcare Communication. The Ulster Medical Journal, 91(1), 59–60. PMC8835413.
38. Pattanayak, D. P. (1985). Diversity in communication and languages; predicament of a multilingual nation state: India, a case study. Language of inequality, 399-407.
39. VanderMolen, J., & Spivey, C. (2017). Creating infographics to enhance student engagement and communication in health economics. The Journal of Economic Education, 48(3), 198-205.
40. Yuvaraj, M. (2017). Infographics: tools for designing, visualizing data and storytelling in libraries. Library Hi Tech News.