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Rural Women's Comprehension of *Hablamos Juntos* Universal Symbols of Healthcare

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Abstract

Much research attention on Health Information Literacy (HIL) has been on textual sources of information with limited studies on understanding how individuals comprehend information presented in the non-textual forms. This paper presents the results of a study on rural women's comprehension of Hablamos Juntos (HJ) universal symbols of healthcare. The study was carried out in the Lake Zone regions of Tanzania. The survey results obtained suggest that majority of women had a low level of HJ symbols comprehension. The study's results on clinical and medical (CM) services symbols matching test partly confirm women's low level of comprehension observed in the survey. Overall, a total of 19 out of 32 CM symbols were not identified at all. In fact, the few symbols mostly comprehended by the women were those the respondents were familiar to. Taken together, these results seem to suggest that low comprehensibility of HJ clinical and medical symbols demonstrated by women in this study is partly due to low levels of education and symbols' traits particularly, familiarity, resemblance, and simplicity. These results can be used as baseline information in a survey for developing healthcare symbols in Tanzania.

Keywords: Health Symbols, Health Literacy, Symbols' Comprehension, Tanzania

Introduction

The use of symbols as a tool for communication is as old as human civilisations (Cowgill and Bolek, 2003). Throughout human history, from the early cave drawings to modern times, symbols have been used as communication tools across different societies (Dowse and Ehlers, 2004). Unlike signs, symbols are immaterial and abstract representations of thoughts in a subjective and interpretative manner. Symbols can either be conceptual or image-related. The symbols in the former form portray abstract images that do not have relationships with the subjects they represent while those taking the latter form are directly related to the referents they represent (Cowgill and Bolek, 2003). Image-related symbols may include pictorial signs such as the red cross and crescent symbols. Unlike with image-related symbols, users have to learn or be taught conceptual symbols to understand them. Nevertheless, when properly designed, symbols are the best communication tools they minimise the effects of differences in levels of literacies and cultural backgrounds (Bees and Mak, 2012). Symbols are the synthesis of a human's social and cultural environment (Ngangah, 2012) with a duo representation of something by itself and something that signifies meaning (Esposito and Pinto, 2015). These traits make symbols' interpretations partly influenced by different cultural, historical, and ideological factors.

In the medical domain, symbols are used in hospitals and other health facilities to provide information to patients and visitors. Healthcare

symbols provide warnings to patients and visitors and directions on how to navigate and access health services (Malhotra, and Somashekar, 2015; Mounika and Brundha, 2015). Between 2003 and 2010, the society for environmental graphic design (SEGD) in the USA developed symbols to be used in hospitals. The symbols came to be known as *Hablamos Juntos (HJ)*, a Spanish phrase that means "*we speak together*" (Hablamos Juntos, 2010). The final set of HJ symbols comprises 54 healthcare symbols. The symbols are classified into three categories: clinical and medical (CM01-CM32) category, in which there are 32 symbols; facilities and administrative services (FA01-FA12) category, which has 12 symbols; and imaging (MA01-MA10) category, which has 10 symbols (Chih-Wei, Huey-Wen, and I-Ping, 2016). Essentially, HJ symbols were developed to assist non-English speaking users and visitors of health facilities in the USA. These symbols have eventually been adopted by many countries following a series of tests for their universal applicability.

Research Problem Statement

Symbols have been used as an effective communication tool that overcomes language barriers in health facilities (Dowse and Ehlers, 2004). Indeed, their potentials are renowned across different communities. However, despite conventional consensus on the universality of symbols, HJ symbols, like any other symbol, may be subjected to multiple interpretations across different communities. Thus, the conventional wisdom in Health Information Literacy (HIL) that conceptualises HIL as the ability to read, access, appraise, understand, and use a wide range of information sources for making informed decisions (Kassim and Ndumbaro, 2020) should be considering these symbols as an area of curiosity. To the contrary, evidence from extant studies (see, for instance, Egunjobi, 2014; Ekoko, 2020; Eriksson-Backa, Ek, Niemela, and Huotari, 2012; Hirvonen, Ek, Niemelä, Korpelainen, and Huotari, 2015; Noora Hirvonen et al., 2020; Meherali, Punjani, and Mevawala, 2020) demonstrates that the majority of research done on HIL has focused on textual sources of information and paid very limited attention to health information presented in graphical or abstract forms such as symbols.

Since people's interpretation and understanding of health symbols may partly be influenced by their cultural, historical, and ideological backgrounds (Dowse and Ehlers, 2004), HJ symbols' comprehensibility, particularly in developing countries like Tanzania, is an aspect that needs extensive testing. For this reason, the limited research (Benedicto and Tibategeza, 2021; Mdukula, 2018) focused on signage in public health institutions from a linguistic perspective in Tanzanian highlights the limited testing done to establish the applicability of symbols in the nation's health system. As such, this study, which was motivated by the need to explore rural women's comprehension of HJ "universal healthcare symbols" was carried out.

Purpose and objectives of the Study

As part of a series of studies on rural women's information health information literacy, the current study focuses on comprehension of medical and clinical service symbols. Overall, the study has explored rural women's comprehension of HJ Universal health symbols. Specifically, the study had two main objectives. The first was to explore how women of reproductive age comprehend HJ clinical and medical symbols while the second was to examine the influence of social demographic factors on women's understanding of HJ universal health symbols.

Related Literature

Symbols in Health Facilities and Hospitals Lack of literacy skills impedes access to information about health services (Cowgill and Bolek, 2003). This has an impact on effective use of healthcare services. As a way of limiting this effect, throughout the history of health service provision, symbols have been used to communicate health information across different health service consumers. These tools have been used to portray specific body parts such as the eye, ear, bone, or brain (Malhotra and Somashekar, 2015) or concepts such as red cross or crescent (Cowgill and Bolek, 2003).

Effective healthcare symbols can contribute to the improvement of health services provision and health outcomes (Cowgill and Bolek, 2003). This is made possible by the symbols' elimination of communication barriers in healthcare provision,

particularly among people with low literacy (Moriyamdae, Harnisch and Matsubara, 1994). In fact, these symbols can break language barriers in communication (Malhotra and Somashekar, 2015), create visual appeal, are universally applicable, and facilitate better memory retention (Malhotra and Somashekar, 2015). All these traits make these tools the best alternative communication method for service providers and health service consumers.

Comprehensibility and Universality of Healthcare Symbols

The term universal symbol is an abstract referent of something or an object that can be comprehended globally regardless of cultural differences. It is agreed among scholars that healthcare symbols guiding hospital visitors should be as universally comprehensible as possible (Lee, et al, 2016). Although there have been different efforts to develop universal healthcare symbols that can be used across different cultural contexts, little empirical evidence is available to testify their universality (Bless and Mak, 2012). Evidently, unlike in other professional and academic domains such as mathematics and musicology, the universality of symbols in the health domain still remains debatable.

Different attributes have been included in studying users' comprehension of symbols. These include familiarity and physical resemblance or semantic closeness, symbols' concreteness, or the extent to which symbols portray real objects and simplicity in terms of the least number of objects or details a symbol has (Blees and Mak, 2012). Studies have also established relationships between individuals' cultural backgrounds and differences in comprehension of healthcare symbols (Bless and Mak, 2012; Cowgill and Bolek, 2003). Cultural background plays a significant role in a person's perception of what a symbol means (Cowgill and Bolek, 2003). As such, for symbols to be effective in aiding health information communication, they must mirror the cultural values and traditions of potential users (Dowse and Ehlers, 2004). In this regard, a need to incorporate symbols that are locally relevant and easily understood by users is paramount (Dowse and Ehlers, 2004).

Blees and Mak (2012) investigated the comprehensibility of pictorial symbols with the intention of establishing if they are really culturally independent and how their interpretations differ across cultures. The results reported suggest that symbols' comprehension is influenced by semantic closeness, familiarity, meaningfulness, concreteness, and simplicity. Other than this aspect, studies have also focused on knowledge of health warning related signs and symbols among medical students (Mounika and Brundha 2016), the effectiveness of symbols used to present medical symptoms to health service consumers (Moriyamdae, Harnisch and Matsubara, 1994) and factors determining symbols' effective comprehensibility (Moriyamdae, Harnisch and Matsubara, 1994; Dowse and Ehlers, 2004). While Moriyamdae, Harnisch and Matsubara, (1994) identified symbols' simplicity as essential in their comprehensibility, Dowse and Ehlers (2004) noted that irrespective of simplicity, symbols are always likely to be misinterpreted.

A few researchers have examined the comprehensibility of HJ healthcare symbols (Lee *et al*, 2016; Chih-Wei, Huey-Wen, and I-Ping, 2016). For instance, Lee *et al* (2016) found variations in the comprehensibility of 14 HJ healthcare symbols across South Korea, Turkey, and the USA. Overall, the main finding of the study was the difference in levels of comprehension of various HJ symbols across individual countries (Lee *et al*, 2016). Symbols for billing, obstetrics clinic, emergency, surgery, and radiology appeared to be well understood cross-culturally while radiology and emergency symbols had the highest level of comprehension across all participant groups (Lee *et al*, 2016). When it came to conclusion, Lee *et al* (2016) were optimistic of the possibility of designing effective universal healthcare symbols that would be cross-culturally understood. On their part, Chih-Wei, Huey-Wen, and I-Ping (2016) conducted a survey to identify HJ healthcare symbols with lower identification and reasons for lower comprehension among health service users in Taiwan. Differences in knowledge, experiences, culture, and level of education were found to influence how individuals interpret the symbols. Overall, only 12 out of 50 HJ symbols were correctly comprehended.

Materials and Methods

Study Area and Study Population

This study was part of a series of studies on Health Information Literacy among women of reproductive age in the rural Lake Zone Regions of Tanzania. The study was carried out in four villages of Iselamagazi, Igaganulwa, Kwibara and Kanazi located in Shinyanga, Simiyu, Mara and Kagera regions respectively. Data collection involved a questionnaire survey and focus group discussions. A total of 349 women of ages between 15 to 49 years participated in the study. These women were purposively preferred for being in their reproductive ages and conveniently selected based on their availability and willingness to participate in the survey. Specifically, 78 women were selected from Iselamaganzi village, 91 were from Igaganulwa, 90 were from Kwibara and 90 women were from Kanazi. Out of these women, 72 were randomly selected to participate in focus group discussions. To do so, a stratified sampling method was used to stratify the surveyed women into three categories based on differences in age, level of education, and distance from health facilities. These factors were considered important in people's comprehension of symbols. A total of eight focus group discussion sessions, two in each village, were conducted. The number of participants in the groups ranged from 8 to 10 women.

Data Collection and Analysis

Health Literacy Instrument for Adult (HELIA) questionnaire was adopted for data collection. While HELIA comprises five sets of HIL attributes: reading, accessing, understanding, appraising, and using, only results on the attribute of understanding were included in this study. Precisely, one aspect of understanding namely "understanding signs and symbols" was used to test women's comprehension HJ symbols. During focus group discussions, a matching test method was conducted. A template containing 32 HJ clinical and medical services symbols (see figure 1) was presented to the women for them to identify correct referents. The participants were asked to identify referents for each symbol and write their responses in either English or Kiswahili language. At the end of the data collection exercise, data from HIL survey were quantitatively analysed. This involved the organisation and comparison of the referents respondents connected to symbols with the actual clinical and medical services (CMSs) signified referents as indicated by HJ symbols CM1 to CM32. The level of comprehension was rated from 0 to 5 as indicated in table 1.

Table 1: Comprehension score summary

Comprehension Score	Descriptions
0	No description at all
1	The description provided is absolutely not related to the referent
2	The description provided indirectly relates with the referent
3	The description provided captures some minor aspect(s) of the referent
4	The description provided captures some major aspect(s) of the referent
5	The response completely relates with the intended referent

Sources: Adopted from, Campbell, Hoffmeister, Kiefer, Selke, Green, and Richman (2004).

Figure 1: Clinical and Medical Services HJ Symbols

Sources: Hablamos Juntos, 2010

Research Ethics

The project applied for and obtained an ethical certificate from the Tanzania National Institute for Medical Research (NIMR). Research clearance was also granted by the respective authorities in the four studied regions and districts. Informed consent was obtained from respondents and participation in the study was voluntary with no financial inducements. Precautions were taken to ensure that sharing of research results with participants and stakeholders does not compromise respondents' privacy, confidentiality, and anonymity. Additionally, confidentiality and anonymity were highly observed in other stages of the study.

Results

Demographic Characteristics

Participants' demographic characteristics (see Table 2) indicate that the mean age of participants was 31.5 years, thus suggesting a generally youthful population. The data obtained also show that a significant number of all study participants (> 50%) had attained a primary level of education while very few (< 5%) attained university level of education. Nearly all the participants (> 90%) resided near health facilities hence more likely to utilize the facilities than those residing far away.

Table 2: Respondents' demographic characteristics (n=349)

Age groups (mean age 31.5)	**Number**	**Percent**
15 – 19	38	10.9
20 – 24	78	22.3
25 – 29	15	4.3
30 – 34	72	20.6
35 – 39	53	15.2
40 – 44	75	21.5
45 – 49	18	5.2
Education	**Number**	**Percent**
Non-formal education	25	7.2
Primary education	220	63.0
Primary school dropout	13	3.7
Secondary school dropout	16	4.6
Secondary school O-Level	56	16.0
Secondary school A-Level	5	1.4
Vocational or technical graduate	3	0.9
University graduate	11	3.2
Distance to the health facilities	**Number**	**Percent**
0 to 1km	32	9.2
2 to 3km	173	49.5
4 to 5km	143	41.0
6 to 10 km	1	0.3

Women's Understanding of Healthcare Symbols

Women's understanding of different healthcare symbols found in local hospitals and health facilities was tested. The results presented here are based on women's self-reporting. Overall, most of the women in the studied communities had problems in understanding different healthcare symbols. The findings suggest that >70% of the study participants had inadequate levels of understanding as shown in Table 3:

Table 3: Women Aggregated levels of symbol comprehension, (n=349)

Aggregated Level of comprehension	**Number**	**Percent**	**HELIA scores**
Inadequate	245	70.2	0.0–50.0
Problematic	78	22.3	50.1–66.0
Sufficient	25	7.16	66.1–84.0
Excellent	1	0.28	84.0–100

Influence of Respondents' Demographic Characteristics on Symbol Comprehension

Respondents' demographic characteristics were tested to find out if they had any influence on their comprehension of symbols locally found in the country. A chi-square test was performed for that purpose (see Table 4).

Table 4: Influence of respondents' demographic characteristics on HJ symbol comprehension (n=349)

Variable	Chi-square	d.f	Significance
Age group	12.203	18	0.837
Education	117.313	21	0.000
Distance to health facility	12.522	9	0.185

Results indicate that while the variable of study participants' levels of education has been found statistically significant at less than 5%, there is an insignificant association between participants' ages and distance to health facilities with their levels of symbols comprehension. As such, education appears to be the primary determinant of women's comprehension of symbols.

Results of the Symbol Matching Test

Comprehension of the Clinical Medical (CM) Services Symbols

Thirty-two HJ symbols on Clinical and Medical (CM) services were presented to study participants and the analysis from the symbol matching test shows that only the Ophthalmology symbol (CM15) was accurately identified by all study participants. The responses given on CM15 exactly matched the intended referent of the symbol thus suggesting the highest level of comprehension. In the other category, 12 of the HJ symbols (*See Figure 2* and *Table 5*) were partially comprehended. The other 19 HJ symbols were excluded from the web.

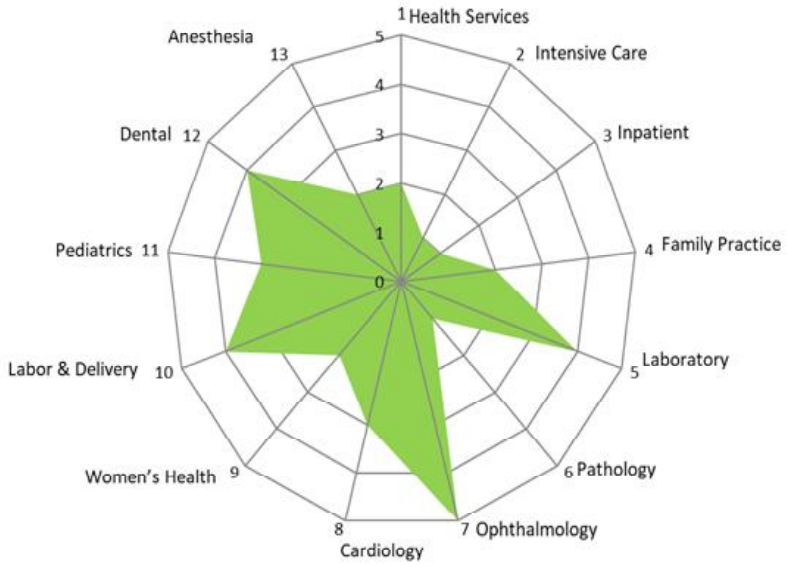


Figure 2: Fully and partially comprehended clinical and medical services HJ symbols

Results of the symbol matching test further show that out of the 12 partially comprehended symbols, three; labor and delivery services, dental services, and laboratory symbols were adequately comprehended with a score of 4 *(Figure 2)*. The scores suggest that participants missed some minor informational elements of the intended meanings of the symbols. Inadequate comprehension of the HJ symbols was also observed on symbols representing health services, family practice, women's health, and anesthesia (See Figure 2). These symbols have scored 2 thus suggesting that the participants' responses did not match the intended meaning of symbols as they captured only minor information elements in the symbols. In contrast, the remaining 19 symbols were not comprehended at all since no descriptions were provided. These included CM03 care staff area; CM05 outpatient; CM06 pharmacy; CM07 diabetes education; CM09 immunizations; CM10 nutrition; CM11 alternative/complementary; CM14 oncology; CM16 mental health; CM17 neurology; and CM18 dermatology. The other symbols were CM19 ear, nose and throat; CM20 respiratory; CM21 internal medicine; CM22 kidney; CM27 genetics; CM28 infectious diseases; CM31 surgery; and CM32 physical therapy. Further results on the 12 symbols that respondents fully or partially comprehended are presented in Table 5. One notable aspect of the results is that multiple referents were provided.

Table 5. Comparison of referents in partially comprehended HJ symbols

HJ symbols	Referents	Comprehended referents
	Health services	• Emergency service • Church • Ambulance • Pharmacy
	Intensive Care	• Drip infusion • Treatment • Labour and delivery • A bed • ICU • Patient ward
	In patient	• A nurse and a patient • Sick person • A nurse in night shift
	Family practice	• Family doctor • Counselling service • Family planning • A family • A church congregation • Consultation room
	Laboratory	• Laboratory • Microscope • Injection room
	Pathology	• Laboratory • Microscope

 Cardiology	• Heart • Love • Heartbeat • Uterus • Radiation
 Woman's health	• Good health • Health service provider • Mosque • A nurse • First aid
 Labor and delivery	• Pregnant woman • Labor room • Antenatal care
 Pediatrics	• Child medical care • A baby • Infants' clinic • Baby first aid
 Dental services	• Dental Services • Mouth and teeth • Teeth • Cervix
 Anaesthesia	• Ventilator • Oxygen • ICU

Participants were able to capture some of the intended meanings of the symbols representing cardiology and pediatric services but missed key informational elements from these symbols. Generally, the results (as indicated in Table 5) show major deviations in some of HJ symbols' comprehension. For instance, the women have associated the cardiology symbol with heart, love, heartbeat, uterus, and radiation. Apart from that, the women have associated the pediatric symbol (see Figure 3) with child medical care, a baby, an infants' clinic, and baby care.

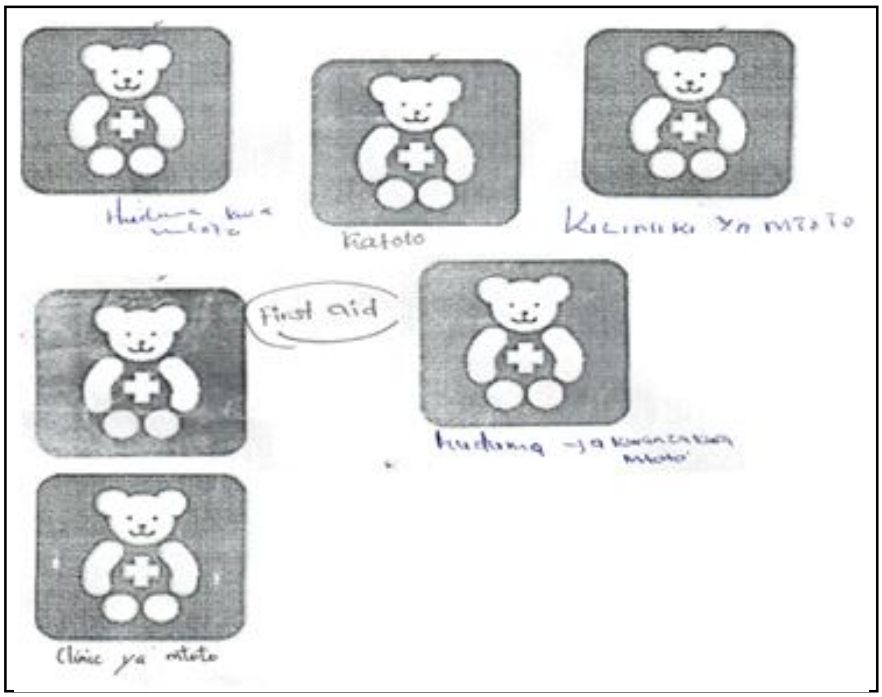
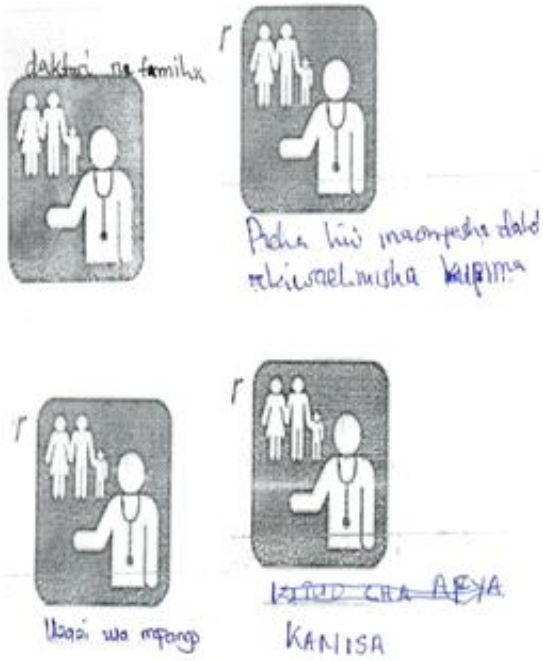


Figure 3: CM26 Pediatric symbol as perceived by study participants

The results also show that the CM1 symbol (health services symbol) has been associated with emergency services, a church, an ambulance and pharmaceutical services. In contrast, the CM 8 - family practice *(see Figure 4)* symbol has, in some cases, been associated with services related to family doctor, counselling and family planning. However, the same symbol was referred to as a family, a church congregation, and a consultation room.



Figures 4: CM8 Family Practice

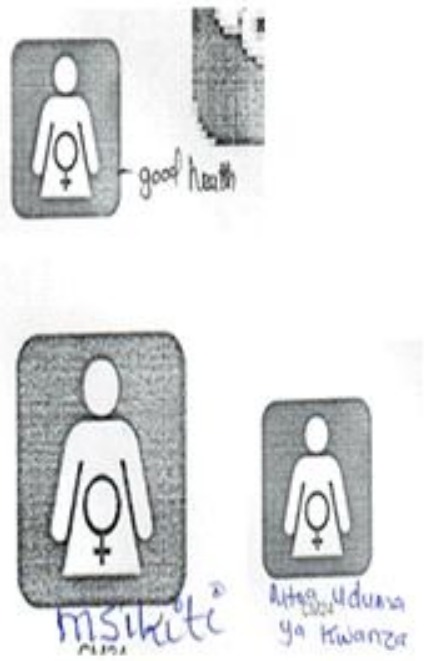


Figure 5: CM24 Women's Health

Different deviations were also noted in the comprehension of CM 24 - women's health symbol (see Figure 5). Referents such as "a sign of good health", "health service provider", "a mosque", "a picture of a nurse", and "first aid" were associated with this symbol by respondents. A symbol representing anesthesia, on the other hand, was associated with a ventilator, oxygen, and a patient in ICU. Similarly, a significant deviation was noted in the meanings women associate with the HJ symbols that represent intensive care, inpatient, and pathology. Although the information provided by the participants was somehow relevant, it did not match the intended meaning of these symbols. The participants, for instance, have associated a symbol representing intensive care with drip infusion, treatment, labor and delivery, a hospital bed, patient ward and intensive care unit (ICU). The latter is the one more closely related to the intended referent. Likewise, a symbol representing inpatient has been associated with a symbol representing a nurse and a patient, a sick person, and a nurse on a night shift while a symbol representing pathology was identified as one representing a laboratory and a microscope.

Discussion

The development of healthcare symbols is an attempt to remove language and other communication barriers by translating medical jargons commonly used by medical practitioners into simple common language understood by health service consumers. However, the effectiveness of such efforts can be undermined by various factors. With such an understanding, this study has explored how women of reproductive age in rural settings comprehend HJ universal clinical and medical healthcare symbols. The study's aggregated results on the comprehension of the symbols show that majority of women had low levels of symbol comprehension. The results on clinical and medical (CM) services symbols matching test partly confirm women's low level of comprehension observed in the survey. Besides women's levels of education, symbols with minimal association with local contexts were more unlikely to be comprehended by women. This is also confirmed by Mayer and Villaire (2007), who noted that symbols with minimal references to local culture are hard to comprehend.

Further, the results on the association between women's demographic characteristics and their levels of comprehension of the HJ symbols have shown a statistically significant association between women's education and their level of symbol comprehension. As such, the findings suggest that women with lower levels of education are less likely to accurately interpret HJ symbols than those with higher levels of education. These results are consistent with those of other prior studies (Joy Lo, Yien, and Chen, 2016; King *et al*, 2012) and thus suggesting that education is paramount in the comprehension of HJ symbols. Although carried out in different domains, previous studies have associated the level of symbols comprehension with people's ages, where one's level of symbol comprehension has been reported to decrease with age (Beaufils et al, 2014; Lesch, 2003;). In contrast, the findings of this study has found no association between age and level of symbol comprehension. However, the difference in this study's findings from those of previous ones can be attributed to the study's targeting of participants of a particular age, meaning that there were no older women that would have added a different perspective to the findings.

Similarly, the study has found an insignificant association between the distance one covers to get to health facilities and their comprehension of HJ symbols. This was an unexpected result considering the presence of enough evidence (see, for instance, Hanson *et al*, 2017; Lohela, Campbell, and Gabrysch, 2012; Quattrochi, *et al*, 2020) that shows how short distances to health facilities promote effective utilization of these facilities by women; a state that was assumed to enhance the comprehension of symbols. In other words, it was expected that since most of the participants resided close to health facilities, their comprehension of the health symbols used in these facilities would benefit from this proximity. It can thus, be concluded that distance to health facilities alone cannot enhance women's level of comprehension of the HJ symbols.

Consistent with some previous studies (Mounika and Brundha, 2016; Blees and Mak, 2012; Cowgill and Bolek, 2003) this study has found that factors such as symbols' traits like familiarity and semantic closeness are associated with high level of comprehension. Healthcare symbols such as an eye which represents the eye's diagnosis and treatment

services, laboratory services, dental services, labor, and delivery services were easily understood by participants. This suggests that familiarity with and physical resemblance of some symbols enhance their comprehension. However, familiarity with some symbols has appeared to be somewhat a factor contributing to multiple their comprehensions. For instance, CM 1 Health services, CM 23 Cardiology and CM 26 Pediatrics, which are widely used in different contexts have attracted multiple referents in this study *(See table 2)*. This is partly due to the fact that these symbols have multiple uses within the same local context.

The results of the current study have partly confirmed the observation made by Blees and Mak (2012) and Dowse and Ehlers (2004) that a symbol's simplicity (i.e. inclusion of minimum objects) enhances its comprehension by users. While some symbols with few objects were easily understood, others with similar characteristics were partly or not comprehended at all. This is related to Dowse and Ehlers's (2004) conclusion that irrespective of their uncomplicatedness, symbols are always subject to misinterpretations. Just like a parable of "six blind men and an elephant" it is worth noting that instead of collectively focusing on all objects within a symbol, women's comprehensions were influenced by the power of perspective. Symbols representing intensive care with objects such as a drip, a bed, a person, and a bedside monitor attracted multiple interpretations. Further, women had a hard time comprehending symbols that look alike such as pathology and laboratory as well as intensive care unit and inpatient symbols. The association of family practice symbol with family planning could be attributed to beliefs among many African societies that associate family planning practices with having a small family as opposed to regular birth intervals.

Limitations of the Study

It is plausible that this study was faced with two limitations. The first is that although there are three sets of HJ symbols, the study has used only one set of 32 clinical and medical symbols to explore these tools' comprehension among rural women of reproductive age using symbols. The other two sets of symbols, namely facilities and administrative services symbols, and imaging were deliberately excluded from the study. This was majorly done because the symbols in categories two and three are not related to medical facilities and services available in rural areas of Tanzania. Nevertheless, this decision limits the study's applicability to other settings. The second limitation was the limited presence of previous studies related to health symbols comprehension. This limited the availability of literature specific to health signs and symbols. In addition to being a limitation to the study, this was also a clear indication of the research gap that this study sought to address. In all, these limitations form the basis for future research.

Conclusion

The current study contributes new insights on the comprehension of HJ universal health symbols. The results of the study indicate that the studied women faced a hard time understanding what HJ symbols represent since 19 out of 32 clinical and medical symbols were not comprehended at all. In addition to the fact that HJ symbols are yet to be implemented in the Tanzania health system, there is also evidence to suggest that some of these symbols are not common in the context in which the study was carried out. Generally, it can be concluded that the low comprehensibility of HJ clinical and medical symbols demonstrated by women involved in this study is partly due to their low levels of education and the symbols' traits, particularly their familiarity, resemblance, and simplicity.

Recommendations and Suggestions for Further Research

This section combines recommendations and suggestions based on the results presented and discussed in the previous sections. To facilitate easy comprehension, health symbols designers should emphasise simplicity and familiar characteristics. Apart from that, since this study has identified women's levels of education as a significant influencer of their ability to comprehend symbols this study also recommends increasing the overall literacy level of women in rural areas by strengthening campaigns to raise their overall level of education. This is expected to enhance the women's comprehension of various health symbols. Conceivably, results from the current study form a

baseline for taking steps towards designing and adopting national healthcare symbols. These symbols could be developed based on a national wide survey using HJ symbols as the framework of reference.

Furthermore, this study has contributed to new insights on studies of healthcare symbols. To further what has been done by the current study, a comprehensive comparative study involving different sections of communities using the three categories of HJ symbols is recommended. In the future, a study on traffic symbols and signs will be conducted using the same methodology but targeting motorcyclists. The rationale for replicating this study to a closely related context is to increase the possibility of generalizing the results to multiple contexts and circumstances.

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