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ORIGINAL RESEARCH

Health Literacy, Label Comprehension, and Consumer Perceptions of Quasi-Drug Information Among Korean Adults: A Cross-Sectional Study

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Purpose: Health literacy (HL) is crucial in understanding labels of healthcare products. This study aimed to evaluate HL and its impact on comprehending quasi-drug labels, assess consumer perceptions of key label elements and their perceived importance, and provide actionable recommendations for improving label design and health communication.

Methods: An online cross-sectional survey of 500 Korean adults (aged 20–69) was conducted in September 2023 using proportionate stratified sampling based on the 2020 Korean Census. HL was assessed using the Korean Rapid Estimate of Adult Literacy in Medicine (REALM-K). The survey included demographic data, quasi-drug usage patterns, comprehension of 63 quasi-drug terms, and perceptions of label elements. A 5-point Likert scale was used to assess the importance, agreement, and need for improvement of label elements, and statistical analyses included descriptive statistics, chi-square tests, *t*-tests, Pearson correlation, and logistic regression.

Results: Most participants had inadequate HL (68.4%). Adequate HL is strongly associated with higher comprehension of quasi-drug terms (r = 0.783, $p < 0.001$). Older age (60–69 years, AOR = 5.97, 95% CI: 1.74–20.48) and adequate HL (AOR = 28.54, 95% CI: 9.68–84.15) positively influenced comprehension. Participants with adequate HL rated the importance of label elements, such as "ingredient name" (mean = 4.02, SD = 0.79, $p = 0.015$) and "contraindications" (mean = 4.68, SD = 0.57, $p < 0.001$), higher than those with inadequate HL.

Conclusion: Significant disparities exist in the comprehension and perceived importance of quasi-drug label elements based on HL levels among Korean adults. Findings emphasize the need for targeted strategies, such as using simplified language and visual aids, to enhance label comprehension. These interventions could improve public health outcomes by increasing understanding of quasi-drug information across diverse HL levels. Future research should focus on developing and testing these targeted interventions to bridge the identified comprehension gap.

Keywords: health literacy, quasi-drugs, label comprehension, communication, Korean adults

Introduction

In Korea, various products, including masks, hand sanitizers, sanitary pads, bandages, adhesive plasters, mosquito repellents, and tonic supplements, are regulated as quasi-drugs. While not categorized as medicines, these products still require regulatory oversight due to their health-related functions. The Ministry of Food and Drug Safety (MFDS) mandates specific labeling requirements for quasi-drugs to ensure consumers have access to the necessary information for safe and effective use.[1] However, the effectiveness of these labels is contingent upon consumers' ability to comprehend the provided information. Despite the widespread use of quasi-drugs in Korea, limited research exists on how consumers interact with and comprehend their labels. Prior studies have demonstrated that low comprehension of quasi-drug labels

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can result in misuse, posing potential health risks.[2,3] Moreover, consumer understanding of essential label elements, such as contraindications and dosage instructions, remains inadequate. This study addresses this knowledge gap by identifying factors influencing comprehension and proposing targeted interventions.

Health literacy (HL)—the ability to obtain, process, and understand basic health information—is crucial for informed decision-making regarding prescription and nonprescription drug use, including quasi-drugs.[4,5] HL is influenced by healthcare and education systems, as well as broader socioeconomic factors. Improving HL is considered one of the most effective strategies for enhancing the population's overall health status.[6] Previous studies consistently demonstrate a strong link between HL and health outcomes, underscoring the importance of clear and comprehensible health communications.[7,8] Inadequate HL can result in misunderstandings, misuse, potential health risks, reduced self-management efficacy, lower quality of life, and increased risk of rehospitalization or mortality.[9–14] Furthermore, low HL has been associated with an economic burden.[15]

The COVID-19 pandemic has emphasized the significance of quasi-drugs, particularly preventive measures such as masks and hand sanitizers.[16–18] The surge in demand for these products has highlighted the need for proper labeling and consumer education.[19–21] For example, excessive use of alcohol-based sanitizers can disrupt the skin barrier, leading to dryness, irritation, and increased susceptibility to infections. In addition, alcohol-based sanitizers pose a fire hazard, further underlining the importance of clear labeling.[21–23] Proper labels must indicate proper usage instructions and precautions in a manner that accommodates consumers' HL, such as through the use of pictograms. Consumer education is also essential. Ensuring effective product use is crucial for public health safety and pandemic control. Despite the widespread use of quasi-drugs, research on consumer interaction with and comprehension of their labels remains limited. Understanding this interaction with quasi-drug labels is essential, especially in light of the heightened importance of these products during the COVID-19 pandemic.

This study aims to assess the level of understanding of quasi-drug labeling among Korean consumers, identify factors influencing their comprehension, and offer implications for improving it. The specific objectives are to (1) evaluate the demographic characteristics of quasi-drug users in Korea and their HL levels, (2) investigate the usage patterns of various quasi-drugs across different HL levels, (3) identify factors affecting the understanding of quasi-drug terms, and (4) assess consumers' perceptions and comprehension of quasi-drug labeling information.

Materials and Methods

Study Design and Recruitment of Subjects

This study employed an online cross-sectional survey to assess HL and its impact on the comprehension and usage of quasi-drug terms among Korean adults. Participants were recruited in September 2023 via an online platform provided by a professional survey agency, utilizing a panel of general population respondents.

A sample of 500 participants aged 20–69 years was selected using proportionate stratified sampling based on the 2020 Korean Census data. The required sample size was determined based on a significance level (α) of 0.05, a Type II error (β) of 20%, an estimated proportion of respondents with high health literacy at 30%, and an estimated proportion of individuals with high term comprehension at 20%. The calculation aimed to detect a minimum odds ratio of 2.[24] This analysis indicated that at least 433 participants were necessary to achieve sufficient statistical power. To ensure robust statistical analysis, a total of 500 participants were recruited. Sample allocation was based on the results of the 2020 Korean Census and included 44 males and 40 females in their 20s, 46 males and 43 females in their 30s, 55 males and 53 females in their 40s, 59 males and 58 females in their 50s, and 50 males and 52 females in their 60s. Eligibility was restricted to individuals who had purchased or used quasi-drugs within the past year.

Data Collection

Data were gathered through an online survey conducted in Korean, compromising demographic questions, an HL assessment, and questions on the usage and comprehension of quasi-drug terms. The survey took approximately 15 minutes to complete. Data collection was conducted simultaneously with participant recruitment in

September 2023. The online survey was structured to allow participants to complete it in a single session, and all responses were finalized by the end of the same month.

HL was evaluated using the validated Korean version of the Rapid Estimate of Adult Literacy in Medicine (REALM-K).[25,26] Based on prior research, participants who responded "I know it exactly" to 61 or more out of the 66 words in the REALM-K were classified as having adequate HL, while those with fewer correct responses were classified as having inadequate HL.[26]

The survey instrument included multiple sections. Participants provided demographic information and reported on their quasi-drug purchasing and usage patterns in the past year based on MFDS's classification criteria. Questions covered purchase locations, label reading habits and extent, and frequency of consulting additional information from various sources. The extent to label reading was assessed on a five-point scale, with "I do not read them" corresponding to 0 and "I read everything" corresponding to 100. Similarly, the frequency of using additional information was measured on a 5-point scale, ranging from "never use" (0) to "very often use" (100).

Label information from 91 quasi-drug products was analyzed using R statistical software to extract relevant terms. Two pharmacists reviewed the extracted terms, excluding common or irrelevant words, resulting in a final list of 63 quasi-drug terms included in the questionnaire, and 5 nonwords were then added to the questionnaire to minimize the possibility of falsely claiming familiarity. Participants indicated their familiarity with each term on a four-point scale, selecting between: "I do not know it at all", "I've heard of it but do not know the meaning", "I have a rough idea of the meaning", or "I know it exactly". Those who indicated they "know it exactly" for 80% or more of the quasi-drug terms were classified as having "high comprehension".

Using a five-point Likert scale, participants rated the importance of elements included and not included on quasi-drug packaging or accompanying documentation, assessed their level of agreement with the readability and content of typical quasi-drug labels (eg, font size, clarity of terms, inclusion of necessary information), and rated the degree of need for improvement for various label elements.

The study protocol was approved by the Institutional Review Board of Daegu Catholic University. Informed consent was obtained from all participants before the survey, assuring them that their responses would remain confidential and anonymous. Participants were also informed of their right to withdraw from the study at any time without penalty.

Statistical Analysis

Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize the study sample's characteristics and responses. Chi-square tests were performed to compare categorical variables (eg, gender, age group, marital status, household size, education level, monthly income, and employment status) between participants with inadequate and adequate HL levels, while independent t-tests compared continuous variables (eg, age and various survey scores) between the two groups.

HL was calculated as the percentage of correctly understood words out of the 66 in the REALM-K. In contrast, quasi-drug term comprehension was calculated as the percentage of correctly understood terms out of the 63 quasi-drug terms. Pearson correlation analysis (r) examined the relationship between HL and quasi-drug term comprehension. Logistic regression analysis identified factors associated with high comprehension of quasi-drug terms, reporting adjusted odds ratios (AORs) and 95% confidence intervals (CIs).

Quasi-drug terms with less than 30% correct identification ("know exactly") were ranked by response rate. Each term's language type and label section were analyzed and presented in a table Responses on the five-point scales for perceived importance of label elements, agreement with current content, and the need for improvements were treated as continuous variables. Means and standard deviations were calculated, with comparisons between inadequate and adequate HL groups using independent t-tests.

Data analysis was performed using SAS version 9.4 (SAS Institute Inc., NC, USA) with a two-sided significance level 0.05.

Results

Demographic characteristics of the study participants, categorized by HL levels, are presented in Table 1. Notable, more than two-thirds of the participants exhibited inadequate HL (342, 68.4%). The gender distribution was nearly equal, with

Table 1 Characteristics of Study Subjects by Health Literacy (HL)

Variables	Inadequate HL (N = 342)		Adequate HL (N = 158)		Total (N = 500)		*p*-value
	N	(%)	N	(%)	N	(%)	
Gender							
Men	162	(47.4)	84	(53.2)	246	(49.2)	0.267
Women	180	(52.6)	74	(46.8)	254	(50.8)	
Age (years)							
20–39	129	(37.7)	40	(25.3)	169	(33.8)	0.009
40–59	151	(44.2)	75	(47.5)	226	(45.2)	
≥ 60	62	(18.1)	43	(27.2)	105	(21.0)	
(Mean±SD)	44.4	13.8	48.4	12.9	45.7	13.6	0.003
Marital status					0		
Single	158	(46.2)	53	(33.5)	211	(42.2)	0.010
Married	184	(53.8)	105	(66.5)	289	(57.8)	
Household size							
1	64	(18.7)	23	(14.6)	87	(17.4)	0.223
2	64	(18.7)	39	(24.7)	103	(20.6)	
≥ 3	214	(62.6)	96	(60.8)	310	(62.0)	
Education Level							
High school or less	64	(18.7)	29	(18.4)	93	(18.6)	0.962
University	246	(71.9)	113	(71.5)	359	(71.8)	
Graduate School	32	(9.4)	16	(10.1)	48	(9.6)	
Monthly income (USD)							
< 722	50	(14.6)	22	(13.9)	72	(14.4)	0.639
722–2166	93	(27.2)	35	(22.2)	128	(25.6)	
2167–3610	102	(29.8)	48	(30.4)	150	(30.0)	
3611–5055	69	(20.2)	35	(22.2)	104	(20.8)	
≥ 5,056	28	(8.2)	18	(11.4)	46	(9.2)	
Employment status							
Full-time	198	(57.9)	89	(56.3)	287	(57.4)	0.415
Part-time	41	(12.0)	14	(8.9)	55	(11.0)	
Unemployed	103	(30.1)	55	(34.8)	158	(31.6)	

Abbreviations: HL, Health literacy; SD, Standard deviation; USD, United States dollar.

49.2% men and 50.8% women, showing no significant difference between the HL groups ($p = 0.267$). However, significant age differences were observed between the groups ($p = 0.009$); the 40–59 years age group was the largest, accounting for 45.2% of the total sample, with a higher proportion in the adequate HL group (47.5%) compared to the inadequate HL group (44.2%). The mean age was significantly higher in the adequate HL group (48.4 years) than in the inadequate HL group (44.4 years) ($p = 0.003$). Marital status also differed significantly ($p = 0.010$), with a greater proportion of married individuals in the adequate HL group (66.5%) compared to the inadequate HL group (53.8%). No significant differences were found between the HL groups regarding household size, education level, monthly income, or employment status. Most participants had a university education (71.8%) and were employed full-time (57.4%).

Table 2 details the usage patterns of various quasi-drugs by HL levels. Overall, high usage rates were reported for masks (94.4%), menstrual hygiene products (35.6%), and items for treating affected areas, such as bandages and gauze (80.4%). Participants with adequate HL reported significantly higher usage of external disinfectants (78.5% vs 66.1%, $p = 0.007$) and low-content vitamin and mineral preparations (85.4% vs 74.3%, $p = 0.007$). Significant differences were

Table 2 Usage Patterns of Quasi-Drugs by Health Literacy (HL)

Variables	Inadequate HL (N = 342)		Adequate HL (N = 158)		Total (N = 500)		*p*-value
Purchase or usage experience (N, %)							
Mask (for health, droplet blocking, surgery)	321	(93.9)	151	(95.6)	472	(94.4)	0.573
Menstrual blood hygiene treatment products	124	(36.3)	54	(34.2)	178	(35.6)	0.726
Items for treating the affected area	270	(78.9)	132	(83.5)	402	(80.4)	0.279
Inhibitors, such as bad breath	242	(70.8)	123	(77.8)	365	(73.0)	0.121
Repellent for mosquitoes and mites applied to the human body	207	(60.5)	106	(67.1)	313	(62.6)	0.190
Contact lens–care products	82	(24.0)	40	(25.3)	122	(24.4)	0.832
Nicotine-free smoking cessation drug	29	(8.5)	8	(5.1)	37	(7.4)	0.241
External disinfectants applied to the human body	226	(66.1)	124	(78.5)	350	(70.0)	0.007
Quasi-drug ointment, cataplasms, including spray type	213	(62.3)	104	(65.8)	317	(63.4)	0.506
Quasi-drug low-content vitamin and mineral preparations, nourishing and strengthening vitamins	254	(74.3)	135	(85.4)	389	(77.8)	0.007
Quasi-drugs gastric digestive agents	219	(64.0)	107	(67.7)	326	(65.2)	0.482
Preparations used for oral hygiene	92	(26.9)	49	(31.0)	141	(28.2)	0.399
Sterile items	151	(44.2)	85	(53.8)	236	(47.2)	0.056
Portable oxygen	38	(11.1)	6	(3.8)	44	(8.8)	0.012
Purchase location of quasi-drug products (N, %)							
Pharmacy	12	(3.5)	6	(3.8)	18	(3.6)	1.000
Convenience store	208	(60.8)	101	(63.9)	309	(61.8)	0.572
Neighborhood store	312	(91.2)	149	(94.3)	461	(92.2)	0.311
Supermarket	278	(81.3)	112	(70.9)	390	(78.0)	0.013
Online shopping mall	262	(76.6)	100	(63.3)	362	(72.4)	0.003
Health & beauty store	303	(88.6)	128	(81.0)	431	(86.2)	0.032
Extent to which quasi-drug labels are usually read[a] (Mean±SD)	47.0	± 25.2	58.5	± 26.0	50.7	± 26.0	< 0.001
Frequency of additional information usage (Mean±SD)[b]							
Manufacturer's website	38.7	± 26.5	40.5	± 25.5	39.3	± 26.2	0.484
Public institutions' website	34.3	± 25.6	39.1	± 24.5	35.8	± 25.3	0.049
General web search engines	61.9	± 26.0	66.3	± 24.1	63.3	± 25.5	0.074
Call the manufacturer's customer service center	28.7	± 25.2	26.1	± 21.7	27.9	± 24.1	0.235
Ask the pharmacist	51.3	± 25.1	58.1	± 27.4	53.5	± 26.0	0.007
Ask your family or people around you	51.3	± 24.1	53.0	± 22.8	51.9	± 23.7	0.459

Notes: [a]The extent to which participants usually read quasi-drug labels was measured on a five-point scale, with "I do not read them" corresponding to 0 and "I read everything" corresponding to 100. [b]The frequency of using additional information from various sources was also measured on a five-point scale, ranging from "never use" (0) to "very often use" (100).

Abbreviations: HL, Health literacy; SD, Standard deviation.

also observed in purchasing locations. Participants with adequate HL were more likely to shop at online malls (76.6% vs 63.3%, $p = 0.003$) and health and beauty stores (88.6% vs 81.0%, $p = 0.032$), while those with inadequate HL favored supermarkets (81.3% vs 70.9%, $p = 0.013$).

The analysis showed a strong positive correlation between HL and quasi-drug term comprehension ($r = 0.783$, $p < 0.001$). Table 3 presents factors influencing the comprehension of quasi-drug terms. Before adjusting for covariates, women had lower word comprehension than men (crude OR = 0.42, 95% CI: 0.22–0.81). However, after adjustment, the difference was not statistically significant (AOR = 0.49, 95% CI: 0.21–1.12). In contrast, older participants, especially those aged 60–69, exhibited better comprehension (AOR = 3.97, 95% CI: 1.39–11.29). Adequate HL was strongly associated with higher comprehension (AOR = 26.48, 95% CI: 9.18–76.44).

Table 4 ranks the quasi-drug terms with the lowest levels of comprehension among respondents. Terms such as "prepared cavity" (2.6% comprehension), "hermetically sealed" (4.6% comprehension), and "erosion" (5.6%

Table 3 Factors Influencing the Comprehension of Terms Extracted from Quasi-Drug Labels

Variables	Total	Respondents with High Comprehension[a]		COR		AOR	
	(N)	(N, %)		(OR, 95% CI)		(OR, 95% CI)	
Health literacy							
Inadequate	342	4	(1.2)	1.00		1.00	
Adequate	158	40	(25.3)	28.64	(10.03–81.77)	28.54	(9.68–84.15)
Gender							
Men	246	30	(12.2)	1.00		1.00	
Women	254	14	(5.5)	0.42	(0.22–0.81)	0.49	(0.21–1.12)
Age (years)							
20–39	169	6	(3.6)	1.00		1.00	
40–59	226	20	(8.8)	2.64	(1.04–6.72)	2.39	(0.79–7.22)
60–69	105	18	(17.1)	5.62	(2.15–14.68)	5.97	(1.74–20.48)
Education Level							
High school or less	93	9	(9.7)	1.00		1.00	
≥ University	407	35	(8.6)	0.88	(0.41–1.90)	1.61	(0.59–4.38)
Monthly income (USD)							
< 2,167	200	16	(8.0)	1.00		1.00	
≥ 2,167	300	28	(9.3)	1.18	(0.62–2.25)	1.18	(0.49–2.83)
Employment status							
Full-time	287	19	(6.6)	1.00		1.00	
Part-time	55	2	(3.6)	0.53	(0.12–2.35)	0.47	(0.09–2.49)
Unemployed	158	23	(14.6)	2.40	(1.27–4.57)	2.37	(0.97–5.81)
Marital status							
Single	211	13	(6.2)	1.00		1.00	
Married	289	31	(10.7)	1.83	(0.93–3.59)	1.25	(0.39–3.97)
Household size							
1	87	7	(8.0)	1.00		1.00	
2	103	10	(9.7)	1.23	(0.45–3.38)	0.22	(0.05–1.00)
≥ 3	310	27	(8.7)	1.09	(0.46–2.60)	0.36	(0.09–1.47)

Note: [a]Participants who responded that they "know exactly" about more than 80% of the quasi-drug.
Abbreviations: AOR, adjusted odds ratio; CI, Confidence interval; COR, crude odds ratio; USD, United States Dollar.

Table 4 Characteristics of Quasi-Drug Terms with Low Comprehension

English Term	Romanization of the Korean Term	Number of Respondents who Know Exactly (N, %)		Language Type[a]	Label Section of Quasi-Drug
Prepared cavity due to dental caries	Wadong	13	(2.6)	Sino-Korean word	Dosage and Administration
Hermetically sealed	Miljeon	23	(4.6)	Sino-Korean word	Precautions for Use
Erosion	Miran	28	(5.6)	Sino-Korean word	Precautions for Use
Dental root canal	Chiageungwan	44	(8.8)	Sino-Korean word	Indications and Effects
Appropriate use	Jeoguisayong	51	(10.2)	Sino-Korean word	Dosage and Administration
Tumefaction	Jongchang	58	(11.6)	Sino-Korean word	Precautions for Use
Aerosol	Aerosol-je	64	(12.8)	Combination	Appearance
Detachment membrane	Baklimak	64	(12.8)	Sino-Korean word	Appearance

(*Continued*)

Table 4 (Continued).

English Term	Romanization of the Korean Term	Number of Respondents who Know Exactly (N, %)		Language Type[a]	Label Section of Quasi-Drug
Pasting up	cheobbu	65	(13.0)	Sino-Korean word	Precautions for Use
Periodontitis	Chigeunmakyeom	66	(13.2)	Sino-Korean word	Precautions for Use
Oblong	Jangbanghyung	70	(14.0)	Sino-Korean word	Appearance
Gauze	Gaahjae	71	(14.2)	Loan word	Appearance
Lacrimal secretion	Nuaekbunbi	76	(15.2)	Sino-Korean word	Precautions for Use
Digestive tonic	Geonwisohwajae	86	(17.2)	Sino-Korean word	Product Classification
Anaphylaxis	Anaphylaxis	88	(17.6)	Loan word	Precautions for Use
Cool and dark place	Naengamso	92	(18.4)	Sino-Korean word	Storage Method
Wound	Changsang	102	(20.4)	Sino-Korean word	Indications and Effects
Pale yellow	Mihwangsaek	103	(20.6)	Sino-Korean word	Appearance
Corneal ulcer	Gakmakgweyang	104	(20.8)	Sino-Korean word	Precautions for Use
Lactose	Yudang	108	(21.6)	Sino-Korean word	Precautions for Use
Burning sensation	Jakyeolgam	116	(23.2)	Sino-Korean word	Precautions for Use
Dental plaque	Chitae	132	(26.4)	Sino-Korean word	Indications and Effects
Flare	Baljeok	139	(27.8)	Sino-Korean word	Precautions for Use
Uric acid	Yosan	145	(29.0)	Sino-Korean word	Precautions for Use

Note: Terms for which fewer than 30% of respondents indicated they "know exactly" are listed. [a]A "Sino-Korean word" refers to a Korean word derived from Chinese characters.

comprehension) were the least understood. The majority of these terms were Sino-Korean words found in the "Precautions for Use" and "Dosage and Administration" sections of the labels.

Table 5 summarizes participants' perceptions of quasi-drug labeling information based on HL. Participants with adequate HL rated the importance of label elements, such as "ingredient name" (mean = 4.02, SD = 0.79, $p = 0.015$) and "contraindications" (mean = 4.68, SD = 0.57, $p < 0.001$), higher than those with inadequate HL. They also showed greater agreement with the current label design, particularly regarding the inclusion of necessary information (mean = 3.50, SD = 0.84, $p = 0.013$) and easy-to-understand terms (mean = 3.10, SD = 0.93, $p = 0.006$).

Table 5 Perception of Quasi-Drug Labeling Information by Health Literacy (HL)

Variables	Inadequate HL (N = 342)		Adequate HL (N = 158)		Total		*p*-value
	Mean	SD	Mean	SD	Mean	SD	
Importance of label elements							
Name of the product	3.37	0.91	3.47	0.96	3.41	0.92	0.258
Ingredient name	3.83	0.82	4.02	0.79	3.89	0.82	0.015
Dosage and administration	4.27	0.81	4.49	0.59	4.34	0.75	0.001
Indications and effects	4.22	0.80	4.50	0.61	4.31	0.76	< 0.001
Capacity/volume	3.75	0.82	4.04	0.74	3.85	0.81	< 0.001
Contraindications	4.31	0.84	4.68	0.57	4.43	0.78	< 0.001
Contact information for reporting side effects	3.94	0.88	4.33	0.73	4.06	0.85	< 0.001
Expiration dates	4.08	0.86	4.37	0.69	4.17	0.82	< 0.001
Indication of "quasi-drugs"	3.68	0.87	3.96	0.84	3.77	0.87	< 0.001
Frequent or serious side effects	4.12	0.90	4.60	0.59	4.27	0.84	< 0.001
How to deal with side effects	4.23	0.90	4.58	0.60	4.34	0.83	< 0.001

(*Continued*)

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Table 5 (Continued).

Variables	Inadequate HL (N = 342)		Adequate HL (N = 158)		Total		*p*-value
	Mean	SD	Mean	SD	Mean	SD	
Agreement with the current label							
Easy-to-read font size	2.43	1.04	2.35	1.02	2.40	1.03	0.411
Necessary contents are all included.	3.29	0.87	3.50	0.84	3.36	0.87	0.013
Important points are highlighted.	3.03	1.03	3.20	0.99	3.09	1.02	0.082
The words are easy to understand.	2.85	0.98	3.10	0.93	2.93	0.97	0.006
The "quasi-drug" label is clearly distinguished.	3.15	0.97	3.48	0.90	3.25	0.96	< 0.001
The packaging design allows the label to be clearly identified.	2.99	0.90	3.27	0.84	3.08	0.89	0.001
I can understand the contents well without the help of a pharmacist.	3.11	0.90	3.48	0.87	3.23	0.91	< 0.001
Overall, I am satisfied with the items written or labeled on the quasi-drug packaging.	3.03	0.89	3.23	0.84	3.09	0.88	0.021
Need for improvement							
I wish the font size were bigger.	3.99	0.78	4.17	0.59	4.04	0.73	0.004
It would be good to include a simple table or picture along with the text to help understand the content.	3.90	0.84	3.90	0.84	3.91	0.83	0.624
I wish the instructions were shorter.	3.61	0.90	3.78	0.89	3.67	0.90	0.045
I wish there were more information included.	3.03	0.82	3.04	0.87	3.03	0.83	0.885
It would be better if you use other words or symbols to indicate the importance.	3.77	0.87	4.01	0.80	3.85	0.86	0.004
It would be nice to see the details using a smartphone app.	3.63	1.00	3.94	0.89	3.73	0.97	< 0.001
I wish that words that were easier to understand were used.	3.85	0.92	4.01	0.87	3.90	0.91	0.075

Note: Responses were scored on a five-point scale.
Abbreviations: HL, Health literacy; SD, Standard deviation.

Discussion

This study identified significant disparities in comprehension and usage patterns of quasi-drug labels based on HL. Notably, participants with inadequate HL were younger on average (mean age = 44.4 years) compared to those with adequate HL (mean age = 48.4 years), highlighting the need for tailored interventions for younger demographics. Additionally, comprehension of specific quasi-drug terms, particularly technical and Sino-Korean words, was markedly lower among participants with inadequate HL. These findings underscore the necessity of simplified terminology and visual aids to improve understanding.

The analysis of quasi-drug usage patterns revealed high overall rates for commonly used products such as masks (94.4%), menstrual hygiene products (35.6%), and items for treating affected areas (80.4%). However, participants with adequate HL reported significantly greater usage of external disinfectants and low-content vitamin and mineral preparations compared to those with inadequate HL. This highlights the necessity of tailored educational strategies to bridge the knowledge gap and ensure individuals with inadequate HL are equally informed about the benefits and proper use of these products. Furthermore, notable differences in purchasing behavior were observed; participants with adequate HL were more likely to shop at online malls and health and beauty stores. These findings suggest that e-commerce platforms, particularly those tailored to younger, tech-savvy consumers, could serve as effective channels for delivering targeted HL interventions and improving comprehension.

The study identified several factors influencing the comprehension of quasi-drug terms. Women were found to have lower odds of high word comprehension than men, indicating the need for gender-specific strategies to improve HL.[27] Recent research suggests that while age may not significantly influence health outcomes, HL remains crucial, especially among older adults.[28] This study found that participants aged 60 years or older with adequate HL had better comprehension, consistent with previous findings in Korea, where the elderly are categorized as 60 or older.[29] Other studies

subdivided the elderly into those aged 60–69, and 70 or older groups reported significant differences in HL.[30,31] Research has also demonstrated higher HL among young adults (18–45 years) and younger elderly (65–75 years) with social support, while HL was much lower among those aged 76 or older.[32] If this study had divided the elderly into those in their 60s and those in their 70s or older, results might have aligned with these previous findings. Targeted education efforts addressing socioeconomic factors such as gender and age could significantly enhance HL and word comprehension.

Analysis of quasi-drug terms with low comprehension indicated that many were Sino-Korean words used in technical contexts like "Precautions for Use" and "Dosage and Administration", posing a barrier for individuals with lower HL and emphasizing the need for simplified language.[33] This suggests a critical need for labels to incorporate user-friendly language and design features such as pictograms and concise instructions. Difficult healthcare terminology can hinder HL, as previous research has shown the need for healthcare professionals to explain terms to patients with low HL better.[34] Social support has been demonstrated to enhance HL,[32,35] suggesting that limited HL should be considered a societal and healthcare system responsibility, not merely an individual one.[36–38]

Participants with adequate HL rated label elements such as "ingredient name" and "contraindications" more important than those with inadequate HL. They also expressed stronger preferences for improvements, including larger font sizes and visual aids like tables or pictures. Incorporating pictograms and simplified verbal instructions could enhance comprehension, especially among older and less educated individuals.[12,39]

The COVID-19 pandemic has highlighted the vital role of quasi-drugs, particularly masks and hand sanitizers, in disease prevention and spread. Ensuring all consumers, regardless of HL, can understand and properly use these products is crucial for public health safety. The findings suggest that tailored communication strategies—including simple language, visual aids, and digital platforms—could enhance comprehension and safe quasi-drug use.

However, this study has several limitations. The cross-sectional design provides a snapshot of HL and quasi-drug label comprehension, limiting causal inference and the ability to capture changes over time. The reliance on self-reported data introduces the potential for recall or social desirability bias, potentially leading to overestimation of comprehension or usage. While HL was assessed with the Korean REALM-K tool, it may not fully capture skills such as numeracy or visual literacy needed for label comprehension. In addition, findings may not be generalizable to other cultural or regulatory contexts. The focus on technical terms and inclusion criteria limited to those who had used quasi-drugs in the past year may also affect generalizability.

The study's strengths include a large, representative sample of Korean adults and the use of a validated HL assessment tool, enhancing the reliability of the findings. The comprehensive survey addressed multiple aspects of quasi-drug usage, label comprehension, and perceptions, capturing a multifaceted view of consumer behavior. The inclusion of both actual quasi-drug terms and nonwords helped minimize response bias. The study's emphasis on age, gender, and HL level provides valuable insights for developing targeted strategies to improve public health outcomes.

Based on the observed disparities in comprehension, we recommend implementing several strategies to improve consumer understanding. First, technical terms, particularly Sino-Korean words, should be simplified to enhance accessibility for individuals with varying levels of health literacy. Additionally, visual aids such as pictograms and tables should be incorporated into quasi-drug labels to make the information easier to comprehend. Furthermore, tailored educational interventions should be designed to target younger populations, who may exhibit a greater comprehension gap, to ensure they receive the necessary information to use these products effectively.

Conclusion

This study underscores the importance of health literacy (HL) in understanding quasi-drug labels. The findings identify key factors influencing comprehension, including HL levels and demographic characteristics such as age, which provide a foundation for developing targeted interventions. Improving HL and label comprehension through strategies such as simplified language, visual aids, and targeted education is crucial for promoting the safe and effective use of quasi-drugs. These measures can ultimately foster better public health outcomes by addressing disparities in consumer understanding.

Abbreviations

AOR, Adjusted odds ratio; CI, Confidence interval; HL, Health literacy; MFDS, Ministry of Food and Drug Safety; REALM-K, Korean version of the Rapid Estimate of Adult Literacy in Medicine; SD, Standard deviation; USD, United States dollar.

Ethics Approval and Informed Consent

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of Daegu Catholic University (IRB Number: CUIRB-2023-0033). Informed consent was obtained from all subjects involved in the study.

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Disclosure

The authors report no conflicts of interest in this work.

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