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## RELATIONSHIP BETWEEN BEHAVIORS FOR PURCHASING OTC MEDICINES AND LITERACY OF CONSUMERS EXPLORING THE DIGITAL EXPERIENCE BASED ON A TABLET SYSTEM

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### ABSTRACT

The rapid development of e-commerce and impact of the pandemic may affect consumers' healthy behavior in purchasing OTC medicines. This study aimed to examine the relationship between Japanese consumers' current behaviors of purchasing OTC medicines and literacy through exploring the digital experience of purchasing based on tablets. An online questionnaire was conducted in the Kanto region of Japan, which included questions on purchasing behaviors and medication literacy, and the Japanese version of the eHealth Literacy Scale. Of the participants who had experience in purchasing OTC medicines, 89.47% preferred to buy them at pharmacies or stores, whereas 9.47% tended to purchase them online ( $\chi^2(2) = 271.50, p < .01$ ); 64.24% accepted choosing medicines through a digital screen ( $\chi^2(3) = 102.36, p < .01$ ) and 85.26% obtained information through smartphones while purchasing OTC medicines at pharmacies or stores. Young consumers aged 20-29 years used smartphones significantly more frequently than those aged 30-49 years ( $p < .01$ ). There was a positive correlation between eHealth literacy and smartphone use ( $r = .24, p < .01$ ). The results suggest that Japanese consumers prefer to visit a pharmacy or drug store to purchase OTC medicines. They also prefer to search for information about OTC medicines on-site with a digital device, such as a smartphone, rather than buying OTC medicines from online stores. The digital experience of a tablet-based purchasing system would be useful and acceptable for young consumers and those with high eHealth literacy.

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## 1 INTRODUCTION

In Japan, self-medication has been promoted since the revision of the Pharmaceutical Affairs Law in 2006 (Narui et al., 2013), to include medicines that can be purchased without a prescription; hence over-the-counter (OTC) medicines play an important role in self-medication. With the rapid development of e-commerce and the impact of the global pandemic, the health behaviors of consumers related to purchasing OTC medicines are constantly changing. Previous studies have demonstrated the factors affecting the behaviors of online shopping for medicines (Gatt Baldacchino & Zarb Adami, 2016), as most consumers still do not prefer to buy OTC medicines online. Meanwhile, eHealth literacy is a key factor affecting people's medication ability from electronic sources, such as the Internet (Norman & Skinner, 2006), which is associated with certain health-related behaviors of Japanese adults (Mitsutake et al., 2016). Medication literacy affects people's health, medication behaviors, and decision-making (Pouliot et al., 2018). However, few studies have considered the impact of literacy when creating a digital design for OTC medication. Considering the importance of eHealth and medication literacy in health behaviors, the present study aimed to examine the relationship between the current healthy behaviors of Japanese consumers purchasing OTC medicines and literacy, exploring the novel digital experience of purchasing OTC medicines on tablets (Shinoda et al., 2019; Zhang & Koyama, 2020).

## 2 METHODS

The online survey questionnaire was conducted in the Kanto region of Japan; it included the following four sections: (a) the Japanese version of the eHealth Literacy Scale (J-eHEALS) (Mitsutake et al., 2011) to measure consumers' eHealth literacy; (b) the OTC medication literacy questions (Kawase et al., 2016) to measure the medication literacy ability of consumers; (c) the questions regarding purchasing behaviors related to OTC medicines, such as how to purchase OTC medicines, which approach is better in choosing OTC medicines, and use of smartphones at local pharmacies or stores; and (d) demographic questions. In total, 450 Japanese participants, aged 20-49 years, answered the questionnaire through Freeasy, an online survey platform in Japan. After excluding the invalid responses, based on the screening question, "Which of the following questions was not mentioned in this survey?" to check for the presence of malicious responses, 288 respondents' data were finally analyzed.

## 3 RESULTS

### 3.1 The characteristics of respondents

In the present study, 47.92% of the participants were male. The age distribution of the respondents was: 32.99% ( $24.81 \pm 2.90$ ) were 20-29 years old, 30.55% ( $23.94 \pm 2.94$ ) were 30-39 years old and, 36.46% ( $44.86 \pm 2.93$ ) were 40-49 years old. The mean score of J-eHEALS was 22.65 ( $SD = 6.64$ ), with 139 (48.26%) respondents with high eHealth literacy (Mitsutake et al., 2011; Mitsutake et al., 2016). The average score of OTC medication literacy was 20.55 ( $SD = 2.22$ )

(Kawase et al., 2016), and there was a positive correlation between J-eHEALS scores and OTC medication literacy ( $r = 0.17, p < .01$ ). Japanese consumers may have a wide range of approaches to obtaining OTC medication information, and are not limited to electronic sources such as the Internet.

### 3.2 The current behaviors while purchasing OTC medicines.

First, the results of “How do you purchase OTC medicines?” showed that almost 66% of the respondents had the OTC medicines purchasing experience (**Figure 1**), of which 89.47% preferred to buy medicines at local pharmacies or stores, and 9.47% preferred to purchase them online ( $\chi^2(2) = 271.50, p < .01$ ). Meanwhile, the results regarding which approach was better for choosing OTC medicines revealed that 32.29% of respondents selected OTC medicines directly from the shelves, and 64.24% accepted searching through digital screens (this includes 43.75% who chose either of the two options and 20.49% who chose to search on digital screens) ( $\chi^2(3) = 102.36, p < .01$ ). Most Japanese consumers have purchasing experience for OTC medicines, and the majority prefer to buy them at local pharmacies or stores; only a few prefer to purchase them online. Regarding opinions on the choice of approach, most participants accepted choosing medicines through digital screens, which also demonstrated the feasibility of the digital purchasing experience for OTC medicines in terms of the tablet-based system.

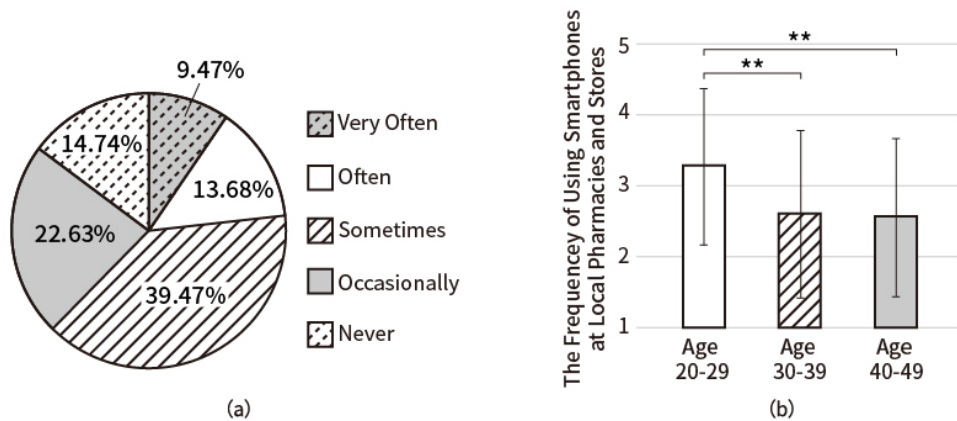


**Figure 1.** Results of (a)How do you purchase OTC medicines? and (b) Which approach for choosing OTC medicines is better?

### 3.3 Relationships between purchasing behaviors and literacy of consumers.

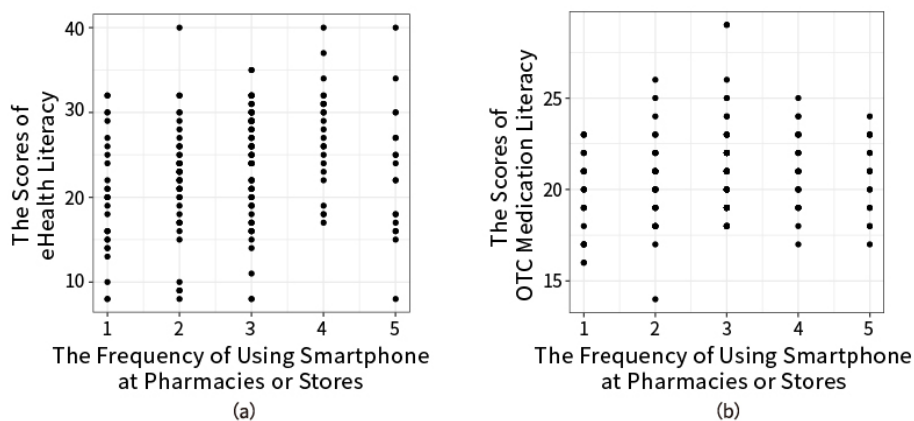
The participants were asked if they had ever used a smartphone to collect information regarding OTC medicines when purchasing them at pharmacies or stores (**Figure 2**). A five-point scale was employed for the assessment (5 = very often, 4 = often, 3 = sometimes, 2 = occasionally, 1 = never). More than 85% of the participants reported using a smartphone to collect information about OTC medicines in pharmacies and stores, and a one-sample *t*-test (compared to sometimes) showed a high frequency of smartphone use at local pharmacies and stores ( $t(189) = -2.35, p < .05$ ). Meanwhile, one-way ANOVA showed that usage frequency was significantly different among consumers aged 20-29, 30-39, and 40-49 years ( $F(2, 187) = 8.00, p < .01$ ). Bonferroni post-hoc multiple comparisons revealed that the mean value of the usage frequency of consumers aged 20-29 was significantly higher than that of consumers aged 30-39 ( $p < .01, 95\% \text{ CI } [0.16, 1.14]$ ), and 40-49 ( $p < .01, 95\% \text{ CI } [0.23, 1.14]$ ), respectively. There was no statistically significant difference between consumers aged 30-39 and 40-49 years ( $p = 1.00$ ). A negative correlation was

found between age and the frequency of smartphone use at local pharmacies and stores ( $r = -.29, p < .01$ ).



**Figure 2.** Results of (a) Have you ever used a smartphone to collect information when purchasing OTC medicines at pharmacies or stores? and (b) The frequency of using smartphones at local pharmacies and stores among those aged 20-29, 30-39, and 40-49 years.  $**p < .01$ .

Furthermore, as shown in **Figure 3**, a positive correlation was found between eHealth literacy and the frequency of smartphone use ( $r = .24, p < .01$ ), and a relatively weak positive correlation between OTC medication literacy and the frequency of smartphone use ( $r = .15, p < .05$ ). There was no significant correlation between age and eHealth literacy ( $p = .08$ ) and age and medication literacy ( $p = .34$ ). Taking into account these results, eHealth literacy is more directly related to digital behavior in terms of obtaining information on OTC medicines of respondents, while OTC medication literacy is weakly related to digital behaviors. Younger Japanese consumers are more likely to use electronic devices, such as cell phones, to access relevant information at local pharmacies; however, eHealth and OTC medication literacy have no or weak correlation with age.



**Figure 3.** Results of (a) the correlation between the scores of eHealth literacy and using smartphones at pharmacies or stores, and (b) the correlation between the scores of OTC medication literacy and using smartphones at pharmacies or stores.

#### 4 DISCUSSION

Despite prior studies surveying behaviors toward online pharmacies compared to local pharmacies, and examining the relationships between literacy and health behaviors, there have

been few attempts to study the correlation between consumers' literacy and OTC medicine purchasing behaviors. Our study contributes to the literature by understanding the relationships between current OTC medicine purchasing behaviors and consumers' literacy, and exploring a new digital purchasing experience based on a digital device such as a tablet. It is a novel concept to solve potential health issues through digital devices that consider eHealth and medication literacy. However, due to the limitations of online surveys, we still need to understand how different levels of consumer literacy relate to OTC medication behaviors; how digital devices, such as tablets, can be used to improve the purchasing experience of OTC medicines also needs to be addressed in the near future.

## 5 CONCLUSION

The results of the present study suggest that Japanese consumers prefer to visit a pharmacy or drug store to purchase OTC medicines. They also prefer to search for information about OTC medicines on-site with digital devices such as smartphones, rather than buying OTC medicines from online stores. The digital experience of a tablet-based purchasing system would be useful and acceptable for young consumers and those with high eHealth literacy.

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