

Importance of application development for Korean rice cake culture succession and adolescent obesity

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Abstract. *Background and aim:* Globally, it has been reported that obesity among adolescents increases the rate of overweight and obesity due to genetic factors, unbalanced diet, and a high-fat, high-sugar diet. Obesity in adolescence is increasing in severity as it can lead to adult obesity and even chronic diseases. Based on this awareness of problems, the modern society is attracting the attention to the excellence of Korean traditional food, rice cakes, while pursuing health-oriented thinking. In addition, as the influence of the Korean Wave and interest in Korean food are growing, foreigners visiting Korea are also increasing. However, there is a lack of professional applications that contain information about rice cake, a traditional Korean food. Therefore, this study aims to establish proper eating habits during adolescence, which is greatly affected by growth and development, and to inspire the importance of the history of Korean traditional food, rice cake. *Methods:* It is necessary to develop mobile applications that can promote rice cake, so we would like to introduce the importance of rice cake culture and nutrition education in Korea, healthy rice cake recipes to prevent various diseases, as well as information about rice cake shops overseas and in Korea. *Results:* It appeared that they were looking for knowledge and information on obesity management and nutrition. It was found that Korean rice cakes should be inherited and developed for its valuable cultural resource to future generations. Accordingly, it was found that it would be useful when developing applications for the succession of rice cake culture and adolescent obesity. *Conclusions:* This is expected to promote rice cake, a traditional Korean food, and increase the frequency of rice cake consumption.

Key words: Rice Cake, Rice Cake Culture Succession, Adolescent, Obesity, Application, Republic of Korea

Introduction

It is presumed that rice cakes began in the *Sanggo* period, and as *Siru* was discovered in the Bronze Age, there is an opinion that the shape similar to the present rice cake is the Bronze Age. During the *Joseon* Dynasty, rice cake cookbooks were published, which led to a splendid and diverse development as the center of the royal family and the noble. Cookbooks published in the late *Joseon* Dynasty found that there were about 200 types of rice cakes and about 95 ingredients were used. As a result, it can be seen that the size of rice

cakes in the late *Joseon* Dynasty was quite significant. Korean traditional rice cakes with a long history and tradition have been handed down to this day and have been used as customs for rite of passage, holiday, wedding, and ancestral rites etc. It has been in the spotlight as a special food and special meal since ancient times, but in modern society, various ceremonies are simplified and Western food culture is introduced, changing to Western-style eating habits such as various breads, sweets and cakes. Accordingly, the frequency of consumption of Korean traditional rice cakes, which has

been maintained for thousands of years, is decreasing (1,2).

Materials and methods

Westernized food and rice cake preference

A study found that cakes, donuts, ice cream, and cola were preferred over traditional Korean foods such as rice cakes, *gangjeong*, Korean sweets, fruit salads, and *sujeonggwa*. As a result of the snack preference survey, it was found that the consumption of bread (sliced white bread, baker's bread), ice cream (soft ice cream, ice cream), and fast food (hamburger, pizza, and chicken) was higher than that of rice cake (3,4).

Current status of obesity in Korean youth

The Ministry of Education's Student Health Examination Sample Survey from 2014 to 2018 in Republic of Korea showed adolescent obesity and overweight results. Obesity 11.5%, overweight 9.7% in 2014, obesity 11.9%, overweight 9.9% in 2015, obesity 12.9%, overweight 10.0% in 2016, obesity 13.6% in 2017, overweight 10.3% in 2018, obesity 14.4%, overweight is 10.6%, and obesity and overweight are increasing every year. The rate of fast food consumption at least three times a week was 16.7% in 2016 and 21.4% in 2018, while the rate of soda intake was 27.1% in 2016 and 33.7% in 2017 and 34.7% in 2018. Accordingly, it can be seen that the intake rate of sweet drinks increased by 41.4% in 2016 and 50.3% in 2018 (5). With westernized dietary in eating habits and dietary life about young people's favorite foods have changed into instant foods, fast foods, processed foods, and convenience foods. Western-style eating habits have many high-fat, high-sugar, and high-calorie foods, leading to an increase in lifestyle-related diseases such as obesity, diabetes, and high blood pressure due to excessive intake of lipids (6,7). The problem of poorly formed eating habits in adolescence developed the risk factor for causing adult diseases as it continued to adulthood. In fact, diseases that were thought to be a disease only affecting adults are induced in adolescence, increasing the risk (8). In particular, obesity is a part that can be overlooked because there is no restriction on sex and

age, and there is no pain or symptoms, and it has been reported to increase further in adolescents when many changes occur physically and mentally. In addition, if the uneven eating habit continues, it is believed that nutritional imbalances can cause problems in physical development, intellectual and social development, and further affect life. Therefore, the need to solve the problem of eating habits must be emphasized repeatedly.

Current status of youth obesity in the world

Every year around the world, obesity and non-infectious diseases are facing health problems. The World Health Organization (WHO) has officially decided that obesity is a non-infectious disease and needs treatment and warned that it is a chronic disease. In fact, in 1985, the National Institutes of Health announced that obesity was a disease, and it began with intensive research on obesity. The estimated population of adolescents who were overweight and obese in 1990 was 147 million (9), and in 2016 It was 324 million, an increase of about 2.2 times compared to 1990. In the case of the United States, a survey of the prevalence of obesity in children and adolescents aged 12 to 19 years from 2011 to 2014 showed high numbers of 17.0% and 5.8%, respectively. In addition, if the risk of obesity in children and adolescents is not recognized, complications including hypertension, diabetes, hyperlipidemia and heart disease can be caused, so the risk of obesity is prominent (10). Obesity is increasingly having a serious impact on health, so social problems and importance are appearing greatly.

Nutritional benefits of rice as a staple food for Koreans

Many people complain of allergic diseases due to gluten, an insoluble protein, in wheat, the main ingredient of bread, and this is called celiac disease. In the United States, where wheat is the staple food, it is estimated that about 6% is celiac disease (11). Rice is gluten-free, and the white portion of rice contains starch, protein, minerals, vitamins, thiamine, niacin and folic acid, but is free of cholesterol, fat and sodium (12,13). Sales of gluten-free products in the U.S. increased 81% from 2012 to 2013 (14). Therefore, as interest in gluten-free foods increases, gluten-free products

and rice-based foods are emerging as alternative foods, suggesting that rice cakes are likely to be used.

The necessity of inheriting the rice cake culture for adolescents and the necessity of nutrition education for parents

Worldwide, the problem of not eating breakfast properly is being raised, and the importance and seriousness of breakfast are being studied. If adolescents skip breakfast, they cause nutritional imbalance and show problems with overweight and obesity (15). Because adolescence is a period of growth and development and maturity, it is very important to provide sufficient nutrition to make a healthy body. Therefore, it should be noted that self-consciousness is formed, values are established, and emotional development and intellectual ability are improved (16). However, as women's advancement to society is increasing, they are addressing instant foods and fast foods for convenience rather than cooking at home, and eating out and delivery foods are also increasing. Due to this problem, homemakers are making efforts to consume functional foods that are convenient, safe and well-equipped with nutrients for their growing children, and housewives' wise countermeasures are emerging (17,18). And in other studies, as a result of nutrition education for middle school students, there is a study that shows that eating habits have improved and nutritional knowledge has also improved (4). In addition, in previous studies, the results of 'education through parents' at home and 'through the media' were high as factors of interest in traditional food. Therefore, it is expected that changes in food selection and rice cake intake can be improved positively through rice cake nutrition education, and the necessity of nutrition education is considered to be a part that should be practiced and implemented by all age groups.

Results and discussion

Analysis of related apps

Recently, although cooking-related programs and applications are increasing, there is not enough data on the website and application related to the rice cake.

Therefore, we want to investigate the related data (Figure 1).

Importance of application development

In the past, many people received information through radio, newspaper, and broadcast media (19), but there were restrictions on places and inconvenience to carry. According to the statistics of the smartphone ownership rate in 2018, it can be said that each citizen owns one smartphone as a result of confirming data from the Ministry of Science and Technology Information and Communication and the National Statistical Office (20). As such, smartphones used by everyone are used regardless of time and place due to their convenience. Among various applications, there are applications such as health management, delicious restaurants, delivery, diet and food recipes, but professional applications with information about rice cakes are insufficient. This study intends to produce a video containing data such as rites of passage, seasonal rice cakes, and local rice cakes, including the history and culture of rice cakes that could not be seen in existing cooking applications. We plan to add recipe materials that include traditional rice cake recipes, rice cake recipes with ingredients that can improve obesity, rice cake recipes that can help health, and fusion rice cake recipes with ingredients preferred by each country. In addition, we want to develop the applications with data on local rice cake shops in each region of Korea and rice cake shops overseas. As the interest in rice cakes increases among all age groups, it can be expected that the frequency of consumption of rice cakes can be increased through improved eating habits. Lastly, I hope that it will be provided as a material that can inform the origin, symbolic meaning, and nutritional value and excellence of Korean traditional rice cakes.

The status of rice consumption in Korea, the number of bakeries and rice cake shops, and the relationship between obesity

Rice consumption per capita by year: 72.8 kg in 2010, 71.2 kg in 2011, 69.8 kg in 2012, 67.2 kg in 2013, 65.1 kg in 2014, 62.9 kg in 2015, 61.9 kg in 2016, 61.8 kg in 2017, 61.0 kg in 2018, 59.2 kg in 2019. It decreased every year, and rice consumption in


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떡

분야 CATEGORY 유형 TYPE 연표 CHRONOLOGY 사진자료 백과사전 사진 이용허락 초판본 소개

미디어 검색 결과 (67개) 내 검색기록

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떡 박물관
Tteok Museum

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Figure 1. Rice cake Museum and Encyclopedia of Korean Folk Culture

1989 decreased by half compared to 121.4 kg. However, about rice consumption in the rice cake manufacturing industry (unit: ton, %): It was 168,865 in 2017, 172,317 in 2018, and 176,500 in 2019, an increase of 2.4% and compared with the number of bread making businesses, there are 1,101 bread manufacturing businesses and 13,405 rice cake manufacturing businesses, indicating that consumers increasingly prefer healthy food (21). Research on the function of rice revealed the effect of dietary fiber content of rice on normal blood sugar, blood pressure control, diabetes prevention (22-24). According to further research, rice contains polyphenol compounds caffeic acid, ferulic acid, p-coumaric acid, and sinapic acid, and has antioxidant properties such as flavonoids, γ -oryzanol, and phytic acid. In addition, it was confirmed to contain natural antioxidants such as vitamin E, magnesium, selenium, iron, phosphorus, thiamine, niacin, and folic acid. Moreover, it is said that it is effective for adult diseases (25-28), so it is suggested that it would be good to intake foods using rice as staple foods in many countries other than Asian countries. In view of the efficacy of rice, it would be good to improve eating habits focusing on rice, not instant foods, processed foods, fast foods, and flour-based foods. As the problem of obesity becomes serious, in the modern society, obese adolescents have a risk factor for cardiovascular diseases due to weakening of blood vessels by hypertension, hyperlipidemia, and endothelial failure (29,30). In addition, they have more diseases such as insulin resistance, diabetes, asthma, and fatty liver than adolescents with normal weight, and the prevalence of orthopedic problems due to fractures and musculoskeletal pain was also found to be higher (31-34). Therefore, it is considered as a way to promote rice cake nutrition education and improvement of eating habits while notifying the dangers to not only obese adolescents but also adolescents tamed with Western foods such as bread, fast food, instant food, etc.

Increase in foreign visitors due to the Korean Wave (Hallyu)

The Korean wave (*Hallyu*) began to spread throughout Asia, the United States, and Europe from the mid-2000s to early 2010. At this time,

as the trend of K-POP began, the music video of Psy's Gangnam style, which was unique and humorous, became popular (35). Subsequently, as the songs of the world-famous singer BTS came into the spotlight (36), the Korean Wave began to spread more widely through various social media such as dramas, SNS, and YouTube. In addition, Korean culture and food, along with Korean fashion, beauty, and games, received attention as a factor in choosing to visit Korea (37). According to statistics from the Korea Tourism Organization, 6,022,752 in 2005, 8,797,658 in 2010, 11,140,028 in 2012, surpassing 10 million, and 17,502,756 in 2019, showed a significant increase in the number of tourists each year. Accordingly, the number of foreign tourists visiting Korea is increasing with interest and curiosity in Korea. As a result of a survey of foreigners before and after visiting Korea, it was found that information on Korean foods was obtained from TV media and the Internet (38). In addition, as a result of a survey of foreigners, 32.3% of visitors to see Tourist Attractions and Korean culture was the highest, and 15.2% of them to taste traditional Korean food ranked third (39). However, after visiting Korea, they responded that there was a lack of promotion of Korean food culture and various cultural events and promotions related to traditional food. Therefore, I believe that it is important to inform the excellence of Korean food and publish a booklet, and it will be very helpful in implementing it. Kimchi, a traditional Korean food, is a symbol of Korean culture and a mark of cultural transmission (40). Although kimchi is widely known around the world, there are still many people who do not know about rice cake, one of Korea's traditional foods. Rice cake is a culture and a part of art. In order to promote the excellence of rice cakes in this way, it is suggested that there is a need to devise various measures other than booklets.

Rice cake, a traditional Korean food spread all over the world

K-Pop in modern society has attracted worldwide attention, and among them, Korean idol singer BTS is gaining enthusiastic popularity in many countries. In one broadcast, BTS was shown eating *tteokbokki* deliciously, so *tteokbokki*, Korea's representative snack,

drew attention from overseas fans. Due to this, *tteokbokki* became a popular food by capturing the taste buds of many people as exports increased rapidly (41). As Korea is known around the world, Korean culture and Korean food are receiving attention. In addition, the idea that foreigners do not like rice cakes because they are chewy in the past is an old saying, and it is believed that consumers who are attracted by the chewy texture of rice cakes are increasing. Looking at the export trends of processed rice cakes (*Tteokbokki*) for the past five years, the export performance of rice cakes (unit: \$1,000, %) to Japan and Southeast Asian countries including the United States was 12,279 in 2015, 13,638 in 2016, 16,058 in 2017, 24,612 in 2018, 34,314 in 2019, showing an annual average growth rate of 29.3%, compared to the previous year. In 2018 and 2019, rice cake exports to Japan, the United States, Vietnam, China, and the Netherlands increased by 43%, 25%, 48%, 146%, and 39% compared to the previous year. It is believed to have played a major role in promoting Korean food by K-POP and Korean Wave culture, and that it has also increased sales by making it a simple food (HMR: Home Meal Replacement) that can be easily cooked and entering a local convenience store. However, the most important thing is that it has greatly increased sales to the rice cake industry because it has made Korean taste and local taste appropriately. It was found that rice cakes were purchased on the Internet, at local Korean marts, and at convenience stores (42). Also, in Korea, sales of processed rice, rice cakes, *juk* (Korean porridge) rice noodles and rice crackers using rice continued to increase, and rice cakes increased by 9.4% compared to the previous year. And it has been reported that, while refraining from eating out due to the spread of COVID-19, the number of people purchasing rice cakes through home shopping, and internet purchases has increased (43). The shape of rice cake, which is the material of *tteokbokki*, is various such as stick shape, snowman shape, star shape, heart shape, and there are also bar rice cake (*Garae-ttok*) made with brown rice, black rice, perilla, wormwood, pumpkin and paprika. It is made with red beans, sweet potatoes, and cheese in *garae-tteok* and eaten as a snack or meal replacement, or added during cooking. *Tteokbokki* is generally made by mixing red pepper paste (*gochujang*) and water, and when making a broth, radish,

onion, kelp, or anchovy are sometimes added. Then, add various vegetables and fish cakes and eat it according to your taste, such as ramen, vermicelli, boiled egg, sausage, ham, tempura, seafood, etc. The sauces for *tteokbokki* include red pepper paste (*gochujang*) soy sauce, *jajang*, ketchup, curry, cheese, cream sauce, carbonara, and *mara* sauce and various sauces are being developed to suit the tastes of consumers. *Tteokbokki* was Korea's representative snack loved by all age groups, but over time, our *tteokbokki* gradually became a popular food abroad. In addition, *tteokbokki*, which is easily accessible as the number of tourists visiting Korea increases, is one of the foods eaten when visiting Korea. As a result, Korean food has the potential to become globalized and there is a need to further research and develop *tteokbokki* as it is showing high exports every year. It is necessary to focus on developing the menu by devising various measures such as developing *tteokbokki* that suits the taste of foreigners, using the favorite sauce for each country, and adding rice cake to the food of that country. As modern society shifts to health-oriented thinking, healthy food is increasingly preferred. *Tteok* and *tteokbokki*, traditional Korean foods, are eco-friendly and sustainable foods with low environmental impact, and vegetarians can enjoy them too. *Garae-tteok* is eaten with grain syrup in addition to *tteokbokki* and rice cake soup, so if it is developed as a snack with honey, maple syrup, and fruit sauce, it will be a good menu for adults and children. This requires the efforts and help of several people, including food industry workers, menu development researchers, and professors. In addition, since food-related students have infinite new ideas and potential, holding a cooking competition will bring good results to the rice cake industry.

Rice cake, a traditional Korean food that occupies a large part of history

The first volume of *Samguk Sagi*, a record before the *Goryeo* period, is an old historical book, and let's look at the part of Yuri Lee Sa-geum in the first volume of *Silla Bonggi*. Originally, Yuri was supposed to ascend the throne, but Yuri thought that Talhae had a virtuous deed and recommended him to the throne. But Talhae said that the position of a king is not

something anyone can do, and it is not an easy position for a mediocre, inferior person like me. And when they heard that a good and wise man had many teeth, Yuri and Talhae tried to bite the rice cake. As a result, Yuri with many teeth marks on the rice cake ascended the throne and became the 3rd king of Silla, and his title was Lee Sa-geum means teeth marks, people with many teeth, and the reign of 24-57 years was 33 years. Judging from the records at this time, the teeth marks are clearly visible when the rice cake is bitten, so it is presumed to be *garae-tteok*, *jeolpyeon*, or *injeolmi* (44). Injo, the 16th king of the Joseon Dynasty, fled to *Useong-myeon, Gongju-si, Chungcheongnam-do* to escape the rebellion of Lee Gwal's Rebellion in 1624. After offering *injeolmi* to King Injo, it was so delicious that he asked the name of the dish, but the aides said that they did not know the name and said that a person with the surname Lim served rice cakes to the king. Therefore, it was made by Mr. Lim, and it was called *Limjeolmi* because it meant that it tasted amazingly delicious, and it is said that it became *injeolmi* because it was easy to pronounce (45). *Injeolmi* is mixed with glutinous rice flour and water, steamed in a water pot, and then beaten with a rice cake mallet to make it sticky. Then, it is a rice cake that is eaten by mixing the rice cake batter with yellow bean powder and cutting it into bite-size pieces. *Injeolmi* is eaten in daily life, but it is also eaten in shaved ice on a hot summer day. *Injeolmi* is a traditional food of Korea, and even today, it can be said that *injeolmi* is a favorite food of all ages. Judging from this, it can be seen that rice cake played an important role enough to be used when deciding the throne, and it has always played a big role without missing any moments such as birthdays, various events, and death days. Therefore, we plan to make a video and introduce it to the application to make the history of rice cake, a traditional Korean food with a long history, easier and more interesting. Through this storytelling of our rice cakes, the meaning, history, and value of rice cakes can be highlighted, and it is believed that it will be possible to further impress the public.

Continuous research and development of rice cake, a traditional Korean food

Rice cake, boasting a long history, is a traditional Korean food, culture, and has a big place in our lives. In addition, although there are various types of rice cakes, each rice cake has a meaning and a story, and has been passed down while maintaining the old appearance and taste for a long time. However, in modern society, as food becomes more diverse and abundant, people's tastes have also changed little by little. As a result, rice cakes also changed in a positive direction, and in Korea, various experiments using physiologically active substances and health functional ingredients are being attempted and continuous research is being conducted. There are rice cakes tested using *Moringa oleifera* Leaf, rice cakes tested using *Codonopsis lanceolata*, *tteokbokki* rice cakes tested using cinnamon powder, and rice cakes tested using chickpeas. In addition, ramie leaf, maqui berry, aronia, lemongrass, asparagus, almond, cocoa powder, etc. were added to rice cake and as a result of the experiment, all the experiments were found to have antioxidant function (46-56). Also, as the sugar problem has been raised around the world, some studies have experimented with replacing rice cakes with low-sugar and natural sweeteners, and it has been shown that some rice cake restaurants are already selling them (57-59). For the development of the rice cake industry, more efforts and continuous research should be made to make healthy and delicious rice cakes. Furthermore, it is believed that sales can increase if the nutrition, efficacy, and value of rice cakes are well communicated to consumers.

Development of application apps for the succession of rice cake culture and health of Korean youth

As shown in Figure 2, we intend to inherit the rice cake culture and develop an app for adolescent health. Data on the origin, history, culture, rite of passage, rice cakes eaten types and recipes of rice cakes by region, and classification of rice cakes were collected from ancient Korean literature, ancient cookbooks, and academic papers.

We will also include information on rice cake recipes that have been handed down since ancient

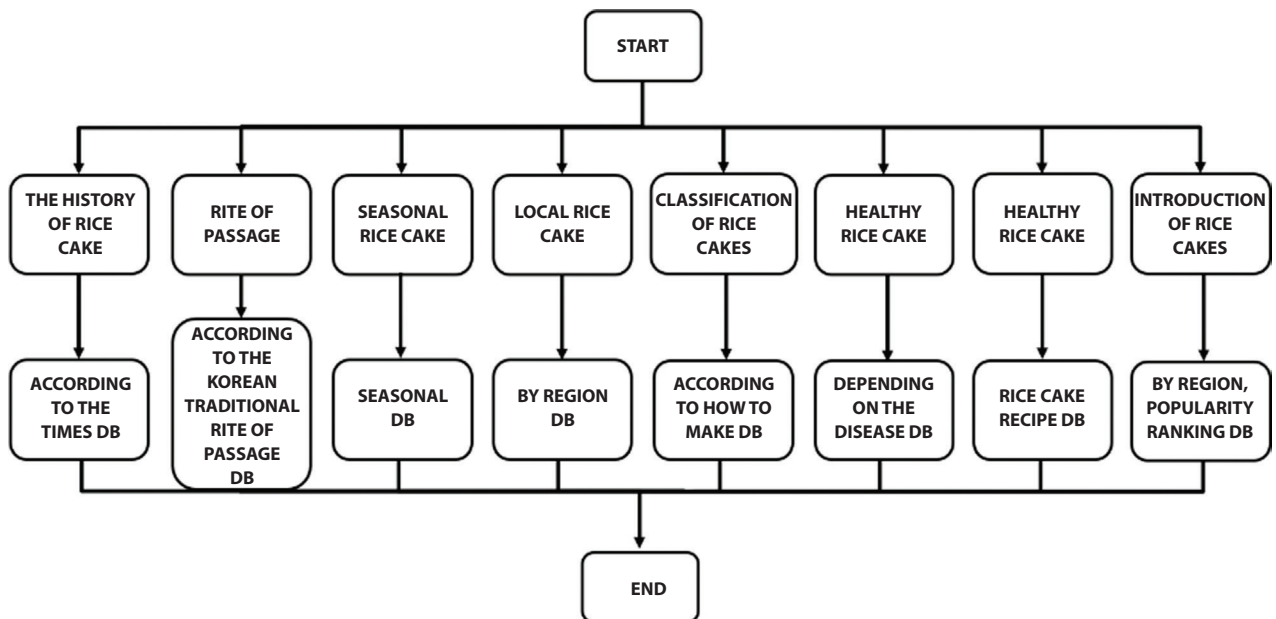


Figure 2. Application Development for Korean Rice Cake Culture Succession and Adolescent Obesity

times, rice cake recipes using ingredients that can help with diseases, and fusion rice cakes made using foreign ingredients. We would like to introduce popular rice cake shops in Korea, and collect and introduce information about rice cake academies that can make rice cakes, and rice cake shops overseas.

Survey results

- As a result of a survey of 80 teenagers using smartphones, 58.8% of them use Android as their operating system, 36.2% of those who use iPhone as their operating system, and 5% of other operating systems.
- Are you usually interested in rice cake? Moderate was the highest with 47.5%, 20% saying 'yes' and 'not so', 10% saying 'very yes', 2.5% saying 'very not'.
- Do you usually manage obesity? Yes 28.7%, usually 26.3%, 12.5%, not so 21.3%, 'very yes', 11.3% 'very not'.
- Are you interested in information about the succession of rice cake culture? 35% said it was 'usually' and 'not so', and 16.2% said 'yes', 7.5% said 'very not', and 6.3% said 'very yes'.
- Do you think it is necessary to eat rice cake in modern society? 'usually' 42.5%, 'yes' 33.8%, 'not so' 12.5%, 'very yes' 8.8%, 'very not' 2.5%.
- Are you interested in information about obesity? Yes, 33.8%, usually, and very yes, 18.8%, 'not so' 17.5%, and 'very not' 6.3%.
- Are you looking for knowledge and information about nutrition? 'yes' was the highest at 40%, and 'It's usually' at 27.5%, 'not so' at 18.8%, 'very' 10%, and 'very not' 3.8%.
- Do you think that Korean rice cake should be inherited and developed? 47.5% 'yes' was the highest, 32.5% 'very yes', 17.5% 'usually', 'not so', and 'very not' 1.3%.
- Do you think that Korean traditional rice cake is a valuable cultural resource to pass down to future generations? 42.5% of 'very yes' and 46.3% of 'yes', 10% of 'usually' and 1.3% of 'not so'.
- If you develop an application for the succession of rice cake culture and youth obesity, would you be willing to use it? It was 40% for 'usually', 33.8% for 'yes', 12.5% for 'very yes', 7.5% for 'not so' and 6.3% for 'very not'.

Table 1. Ingredients for the treatment and prevention of obesity.

Disease	Examples of ingredients and food ingredients
Obesity	<i>Hordeum vulgare</i> , <i>Triticum Turanicum</i> , <i>Triticum turgidum</i> var. <i>durum</i> , <i>Chenopodium quinoa</i> , <i>Avena sativa</i> , <i>Oryza sativa</i> , <i>Fagopyrum esculentum</i> , <i>Amaranthus</i> , <i>Coix lacryma-jobi</i> var. <i>ma-yuen</i> (Rom. Caill.) Stapf, <i>Plantago asiatica</i> L., <i>Glycine max</i> , <i>Phaseolus vulgaris</i> , <i>Canavalia ensiformis</i> , <i>Lens culinaris</i> , <i>Cicer arietinum</i> , <i>Vigna angularis</i> , <i>Prunus dulcis</i> , <i>Juglans regia</i> , <i>Pistacia vera</i> , <i>Arachis hypogaea</i> , <i>Bertholletia excelsa</i> , <i>Carya illinoensis</i> , <i>Macadamia integrifolia</i> , <i>Plukenetia volubilis</i> , <i>Pinus koraiensis</i> , <i>Theobroma cacao</i> L., <i>Raphanus sativus</i> , <i>Brassica oleracea</i> var. <i>capitata</i> , <i>Lactuca sativa</i> , <i>Asparagus officinalis</i> , <i>Spinacia oleracea</i> , <i>Cynara cardunculus</i> var. <i>scolymus</i> , <i>Capsicum annuum</i> , <i>Allium cepa</i> , <i>Beta vulgaris</i> , <i>Apium graveolens</i> , <i>Daucus carota</i> , <i>Solanum lycopersicum</i> , <i>Cucumis sativus</i> , <i>Ipomoea batatas</i> , <i>Dioscorea polystachya</i> Turcz., <i>Helianthus tuberosus</i> L., <i>Persea americana</i> , <i>Wolfiporia extensa</i> , <i>Pleurotus ostreatus</i> , <i>Saccharina japonica</i> , <i>Vaccinium</i> spp, <i>Malus domestica</i> , <i>Musa × paradisiaca</i> , <i>Citrus × paradisi</i> , <i>Prunus pauciflora</i> Bunge, <i>Zizyphus jujuba</i> MILL., <i>Crataegus pinnatifida</i> Bunge, <i>Zingiber officinale</i> , <i>Cinnamomum verum</i> , <i>Camellia sinensis</i> , <i>Coffea Arabica</i>

As shown in Table 1, we will introduce information on how to cook rice cakes using ingredients that help with obesity.

Collection of old recipes and rice cake recipes for making apps

- Rice cake using kelp enzyme decomposition powder, which is effective in improving obesity (60).
Ingredients: Rice flour 100 g, kelp enzyme digestion powder 20 g, salt 0.8 g, water 22 ml, sugar 10 g
 - Put all the ingredients in a bowl, mix and sift through a sieve.
 - Pour water into the steamer, boil it, place *siru* on the steamer, put 1 (powder) in it, and then cover it with a wet cotton cloth and steam it for 30 minutes.
- Seolgi* rice cake using (*Helianthus tuberosus*), which is good for blood sugar control and blood lipid-lowering effect (61).
Ingredients: rice flour 100 g, (*Helianthus tuberosus*) powder 6 g, salt 1 g, water 20 ml, sugar 14 g
 - Put all the ingredients in a bowl, mix and sift through a sieve.
 - Pour water into the steamer, boil it, place *siru* on the steamer, Put 1 (powder) in it, and then cover it with a wet cotton cloth and steam it for 30 minutes.

As shown in Figure 3, we intend to inherit the rice cake culture and develop an application for adolescent health. This study aims to educate rice cakes so that information can be delivered more effectively by inserting text and video instead of conveying information through document education. In this way, it is expected that interest can be aroused and concentration can be increased, and information can be conveyed well and the understanding level will increase, so that it can be remembered for a long time. As the interest in health increases, the modern society will introduce healthy rice cake recipes that can help with obesity and chronic diseases using fruits, vegetables, legumes, and nuts rich in physiologically active substances. In addition, we plan to produce a video of rice cake making and the history of rice cake that has been passed down for a long time so that people of all ages can enjoy making rice cake easily. Lastly, I will introduce Korean rice cake shops and overseas rice cake shops. It tries to develop into an application that can provide information by continuously updating accurate and latest information. It is believed that information and knowledge of rice cakes can be used educationally anytime, anywhere without space limitations, and learning effects can be seen, and it will be a means to efficiently experience Korean culture.

Conclusion

This paper introduces the data collection and necessity of the importance of the succession of Korean rice cake culture and application development for

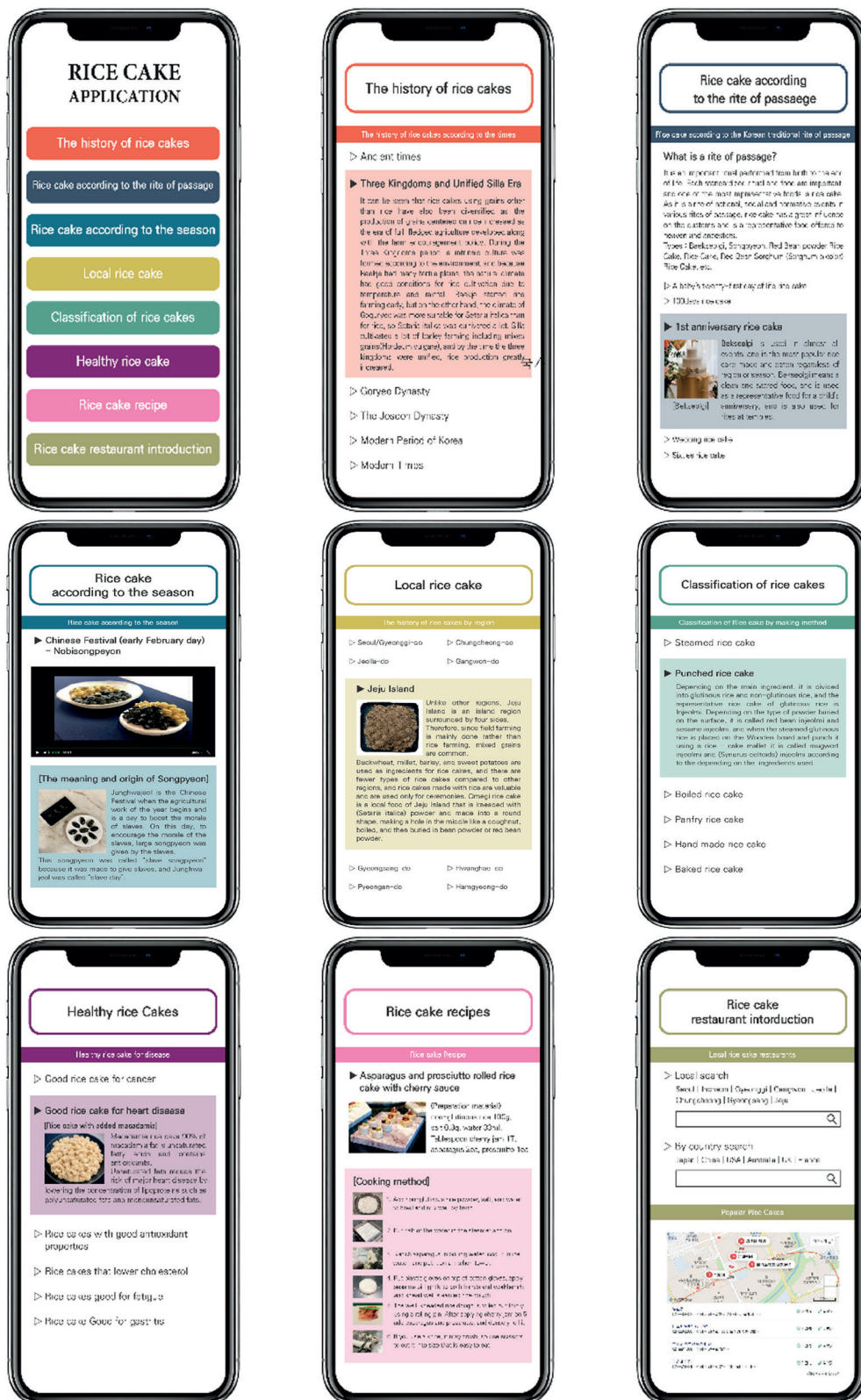


Figure 3. Examples of mobile applications for the succession of rice cake culture and youth health

youth obesity. This study can be said to be necessary for all age groups without limiting only to obese subjects in adolescence. Smartphones that are used anytime, anywhere without space restrictions are used by people all over the world. Through this, they can have an opportunity to study Korean traditional food, rice cake, and will be helpful as a medium to promote rice cake. In addition, if rice cake nutrition education is actively conducted, it is believed that educational use and learning effects can be seen, and interest and understanding will increase, helping to change the perception of rice cakes, thereby increasing the rate of rice cake consumption. Due to the unstable daily life and the situation in the Corona infection crisis, daily life has become more restricted, and life has become different from before. Even now, the corona virus is still in progress, and life has been changed to wear a mask anytime, anywhere. In addition, we refrain from meeting by going out to a minimum, and travel is unthinkable as more and more companies are working from home. Therefore, it is suggested that this study can be used conveniently and will be of great help to all those who are curious and interested in Korea, and we expect that our traditional rice cake will be further developed.

Conflicts of Interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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