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A study on consumer's awareness and practices from the cut flowers during their vase life (a case of Gorgan city)

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ABSTRACT

Purpose: Since most cut flower consumers do not have knowledge as to how to extend the post-harvest life of the cut flowers, the cut flowers purchased by them last for a very short time. The present study aimed to evaluate the people's awareness as to cut flowers and the extent to which they consume and keep these flowers in Gorgan, Iran. **Research method**: The sample size was determined to be 267 individuals by the Cochran formula. Considering the research objectives, 13 questions were developed within a questionnaire. **Findings:** The results showed that 34.1 percent of respondents had no knowledge as to the cut flowers. Among the studied parameters, the cost was the second most important factor in flower choice after interest. Among respondents, 55.1 percent asserted that advertisement and promotion methods were effective on flower consumption. Also, 77.9 percent stated that they only used water to keep flowers and just a little percent added compounds to water. **Research limitations:** Evaluation of people from more cities in Iran. **Originality/Value:** It was found that flower consumption was not in a good state and people in Gorgan, Iran did not have enough knowledge as to the cut flowers and how to keep them and it was far from the ideal situation. To enhance people's knowledge and improve their vision, it is necessary to perform training and extension works by the relevant officials.

INTRODUCTION

The importance of flowers and ornamental plants in human life, especially in today's industrial world, cannot be overstated (Moradi, 2010). Today, the number of people who regularly purchase flowers is growing (Babarabie, 2013). Despite their superb beauty, the cut flowers have limited shelf life and the senescence process happens to them as soon as they are separated from their parental plant. The fresh cut flowers are alive representative of the paternal plant with short longevity (Goszynska & Rudnicki, 1990).

Presently, flower production and supply is perceived as a major economic activity across the world with respect to job and income generation in countries where the climate is appropriate for the growth of flowers and ornamental plants. Annually, over 100 billion USD flowers and ornamental plants are traded worldwide (Edrisi, 2008).

According to the Ministry of Jihad-e Agriculture, Iran more than 30 percent of the crops of the agricultural sector, especially horticulture, is lost after harvest. But, this index represents the average for all agricultural crops and obviously the losses of cut flowers is much higher than this average due to the distance between the production points and market, higher perishability characteristic and having more fragile tissue than other crops (Edrisi, 2010). Mashayekhi and Lashgari (2010) worked on marketing costs of roses and carnations in Tehran province, Iran and found that the main components of the marketing cost of these two flowers were related to their wastage.

The conditions of the plant growth period, the timing and correct way of their harvest, and post-harvest considerations all influence the longevity of the cut flowers. It is estimated that about one-third of post-harvest life of cut flowers is related to pre-harvest conditions and the other two-thirds is determined by post-harvest storage or handling conditions (Gast, 1997).

Since most of the cut flower's consumers do not have knowledge of how to extend the post-harvest life of the cut flowers, the cut flowers purchased by them last for a very short period of time. This contributes to considerable wastages in floriculture sector of Iran so that, in addition to the financial losses and their exportation decline, Iranians show less willingness to buy cut flowers (Jowkar & Salehi, 2005).

Unlike the developed countries, the producers and retailers in Iran are not obliged to treat the flowers to extend their postharvest lifeand purchasers themselves should take care of some points to improve their vase life (Jowkar et al., 2009).

Post-harvest aging of cut flowers is a limiting factor of the marketability of most flower species, so extensive attempts have been made to extend their post-harvest life (Bowyer & Wills, 2003). Postharvest quality loss of most ornamental plants may be associated with the wilting and drop of the leaves and petals, leaf yellowing, and their bending due to the geotropism or phototropism of the stems and so on (Edrisi, 2008). Longer vase life of cut flowers is a major factor contributing to their marketability. Therefore, it is of crucial importance to make use of the methods to extend their vase life and preserve the quality of the flowers (Bayat et al., 2010).

A study focused on the knowledge and behavior of the buyers about the post-harvest physiology of cut flowers in Shiraz, Iran (Jowkar et al., 2009). The results showed that although respondents were properly aware of the conditions of the storage and vase material, they had limited knowledge about most aspects of post-harvest physiology and storage methods of the cut flowers. The finding shows that the buyers studied very little about flowers, the purchasers did not use appropriate transportation conditions, the consumers did not apply commercial preservatives, the vase was not appropriately washed, the flowers were not properly treated by the purchasers before they were placed in the vase, and the flowers

were not suitably cared during their vase life. The present study is designed to evaluate the people's knowledge on use of cut flowers and the methods which they treat flowers during their vase life in Gorgan, Iran.

MATERIALS AND METHODS

The present research aimed to evaluate people's knowledge and behavior as to post-harvest physiology, maintenance conditions, and the purchase rate of cut flowers in Gorgan, Iran. The statistical population was composed of the citizens of Gorgan, of which 267 individuals were selected to be interviewed as the samples by the Cochran formula. The study used descriptive survey methodology. Considering the research goals, some questions were developed in a questionnaire composed of 14 questions. The text of the questionnaire was as follows:

Gender: 1. Male 2. Female. Age: Education Level: Profession: Monthly income:

Marital status: Single. 2. Married Number of children: Family life style: 1. Traditional and native (religious) 2. Semi-traditional 3. Modern

Personality Brigade (Holland): 1. Realistic 2. Finder 3. Artist 4. Social 5. Entrepreneur 6. Regular Type of Ownership: 1. Personal 2. Lease

1. Do you have information about cutting flowers? What is your source of information? (If more than one item is specified). a. No b. Yes (through): 1. Book 2. Radio and TV 3. Academic texts 4. Newspapers 5. Internet network 6. Personal experience 7. Specialists.

2. How much (how many) the amount of purchase (consumption) of the cut flower is by you?

3. What kind of flower do you choose from among the cut flowers? (3 cases) and at what stage (for example, the bud)?

4. How long does it take to transport the cut flowers to your place of use?

5. What is the method of transporting cut flowers? a. Lack of proper cover (dry) b. Use appropriate cover

6. When will you protect the cut flowers? a. No b Yes: Faced with extreme heat or wind

7. Are you using preservative solutions for keeping the cut flowers?

a. No b Yes: 1. Water alone 2. Add sugar and sugar to water 3. Use cooled boiled water 4. Add liquid bleach to water 5. Use of commercial additives or commercial preservative solutions

8. When do you change your vase of water? a. Never. B. When the solution becomes turbid. c. After a day. D After two days. E. After three days.

9. Do you wash your vase? a. No b Yes: 1. With water 2. Disinfected with a substance.

10. After you buy the cut flower, what do you do when you get to your home?

a. No b Yes: 1. Cut the end of the stem (before placing it inside the vase) 2. Dipping (before placing inside the vase) 3. Cutting the lower leaves of the stem (may be in the vase) 4. Dipping the end of the stem Flowers such as rose and gerbera in warm water.

11. Do you cut the end of the stem during the storage period?

a. No b Yes: 1. Recutting the end of the stem 2. Slab 3. To the right size (2-3 cm) 4. Underwater cutting 5. Use a clean tool and a smooth edge for cutting 6. Spray with water (if the Air is warm).

12. What kind of vase do you most use to hold flowers? a. Clay. b. Metal. c. Chinese. d. Glass plastic.

13. What determines the most impact on the selection of cut flowers? Score: Most (1) to lowest (6). a. Price. b. Color c. Smell. D. Shape. E. Kind. F: Interest.

14. What is the most important reason for your use of cut flowers? 1. Personal consumption. 2. Gifts to individuals.

Then, a pilot study was done to determine the validity and reliability of the research instrument using the relevant experts. The reliability was estimated by Cronbach's alpha to be 0.845 in a pilot study on 30 individuals out of the study.

In this research, the interviewees were selected randomly and some of them were not consumers of cut flowers. The data were encoded in the SPSS (ver. 21) software package and were analyzed by descriptive statistics. To accomplish the research objectives, we applied descriptive methods and Spearman correlation test.

The normality of the dependent variable, i.e. the monthly flower purchase rate, was checked by Kolmogorov-Smirnov test in which the decision criterion was found to be less than 5%. This implied that the data were not normally distributed, so nonparametric tests should be applied to explore the impact of the independent variables on the dependent variable.

RESULTS AND DISCUSSION

We found that 34.1 percent of the interviewees had no academic knowledge about cut flowers and their source of knowledge was mostly related to their personal experience and the information they had revived from others. Remaining of the interviewees' knowledge was sourced from books, radio and TV broadcasts, academic textbooks, papers, and the Internet was 2.4, 6, 6.6, 2.5, and 11.2 percent, respectively (Fig. 1).

Information dissemination plays an important role in the development of the societies (Razavieh, & Fayazi, 2008). Analytical radio and TV programs have a very small share in science and technology as do the press (Naeemi et al., 2014). Since different important cut flower species are produced in Iran, the relatively significant extent of people's ignorance of cut flowers that we found in the present study is thought-provoking that calls for a close consideration by the relevant officials in different communication and educational sectors.

Table 1. Calculation of income correlation with the variable of the monthly purchase of flowers.

Monthly flower purchase rate	Independent Variable
0.031*	Income

*significant difference at 5%

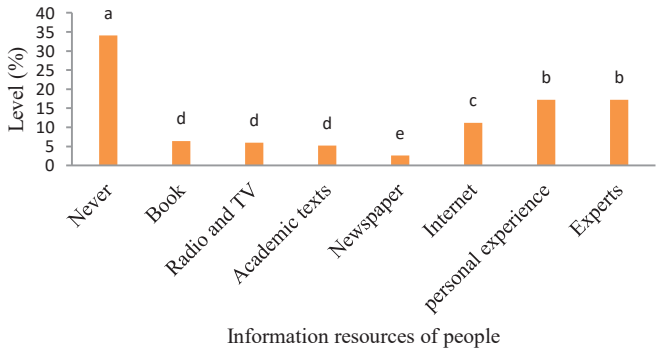

Fig. 1. Information resources of individuals in the case of cut flowers.

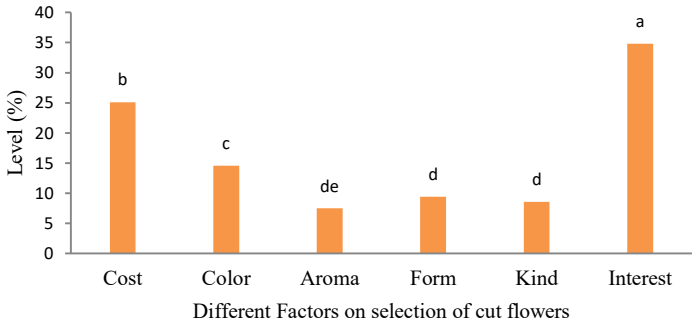

Fig. 2. Effect of different factors on selection of cut flowers.

The results revealed that the mean cut flower purchase rate was 1.32 sprays per month. We applied Spearman correlation to test the relationship of the independent variable of income with the dependent variable of monthly flower purchase rate. The results are summarized in Table 1. It is evident that these two variables were related to one another significantly ($P < 0.05$), showing that more flowers are bought and consumed as the income increases.

Per capital flower consumption rate is 150 sprays per year in Europe while this is as low as 15 sprays in Iran (13). The data for flower consumption in Gorgan shows that the annual flower consumption in this region is close to Iran's average. However, it is very low in this city and in whole the country. It can be said that the real value of the flowers has not yet been well-established in Iran despite its unique climate diversity (Chizari et al., 2005).

Data on respondents' educational level showed that the highest frequency was 25.8 percent for diploma group and the lowest was 1.9 percent for illiterate group. Among the respondents, 55.8 percent described their lifestyle as semi-traditional. Also, among factors underpinning flower choice by respondents, interest (taste) and fragrance had the highest and lowest frequency (34.8 and 7.5 percent), respectively (Fig. 2). Flower market in Iran is made even more complicated by such features as perishability and short life of ornamental plants, its highly depended on taste and culture, and diversism (Shafiei & Mostofi, 2003). After interest, cost was found to be the second most important factor in selection of flower. Flower production is a costly activity in Iran and flower price experiences large fluctuations (Soltan Mohammadi, 2007). This factor may be controlled by cost management and price stabilization so that the shoppers can choose their favorite flowers due to limitations.

According to the results, 62.9 percent of interviewees mainly used the flowers as a gift to others. In a psychological study on the impact of flower gift on people's emotions, Haviland et al. (2005) conducted some psychological interviews and found that individuals who receive flower as a gift from friends and relatives expressed emotional responses and are delighted and even their temptation and social behaviors are desirably influenced. In our study, 55.1 percent of individuals assert that the advertisement methods influence flower consumption. Like all agricultural crops, Iranian producers are in much lower ranks than their international competitors in flower production and marketing and have the least facilities at their disposal. The development of advertisements and the application of information and communication technology for the marketing and e-commerce are among the recommended strategies (Pazaki et al., 2008). According to the results, 50.6 percent of respondents use covering during flower transportation. Also, 42.7 percent stated that they do not protect the flowers against high temperature and wind. Flowers should be protected against physical injuries, water loss, and heat variations. Exposure to direct sunlight is harmful to the cut flowers because it heats up

the flowers and accelerates their wilting (Ebrahimzadeh & Seifi, 1998). Therefore, flower buyers should use proper coverings, which can be supplied by retailers, during their handling (Pacifici, 2013) used vacuum packaging for cut *Matthiolaincana*L. flowers to preserve their quality and extend their life.

The results indicate that 77.9 percent of interviewees use only water to preserve the flowers, 16.1 percent add sugar, and 1.1 percent apply bleaching liquid to the vase solution. Also, 4.9 percent use cooled boiled water (Fig. 3). The application of preservative to vase solution is a common way to extend the vase life of the flowers (Van Doorn, 1998). Extensive research has recently focused on the impact of preservative on flowers all around the world including Iran. But, since most applied preservatives are expensive chemicals and not available to public soalmost all preservatives have been confined just to research without practical application. However, there has also been some research on the use of some cheap, conventional and highly available compounds. For example, Golshadi Ghale-Shahi et al. (2015) reported the positive impact of sour orange fruit extract and sucrose on the vase life of cut *Narcissus* flowers. Babarabie et al. (2015) reported that Cola extended the vase life of cut *alstroemeria*. The application of sodium hypochlorite improved the vase life of cut roses too (Edrisi et al., 2007). Thus, we can say that inadequate training, expensiveness and low availability of the compounds, and the lack of commercial preservative are the main challenges in flower market of Iran. Flowers are typically kept in drinking water after harvest. Due to the source of the drinking water, it contains various chemicals, different pH's, and polluting organic matter and microorganisms (Ghasemi Ghahsareh & Kafi, 1998). Distilled or ion-free water performs better for cut flowers and facilitates water uptake by stem veins. It also helps the solubility of flower preserving solutes. If mineral-ions-free water is not available, we can use cooled boiled tap water (Ebrahimzadeh & Kafi, 2010). MeshkatiJirsaraei and Hashem Abadi (2013) reported that distilled water extended the vase life of cut ornamental sunflowers and postponed the loss of petal protein.

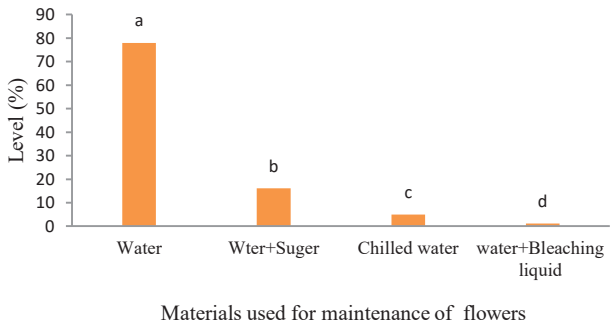

Fig. 3 Selection of preservative solution for cut flowers

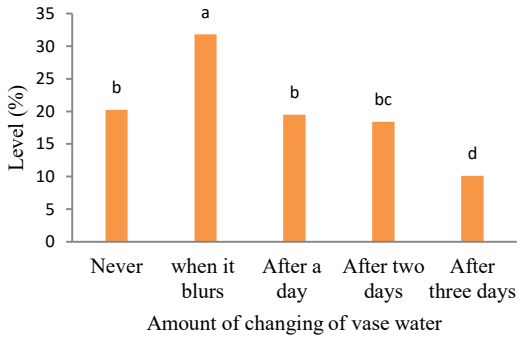

Fig. 4. Amount of changing cut flowers waters

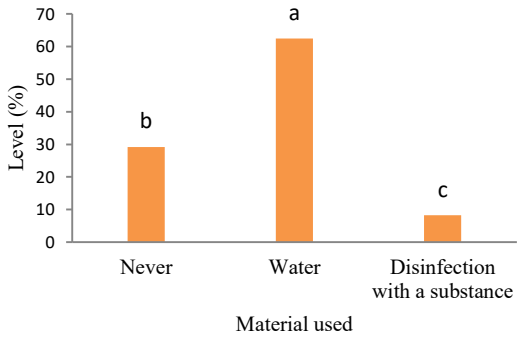

Fig. 5. The amount of washing the vase of cut flowers

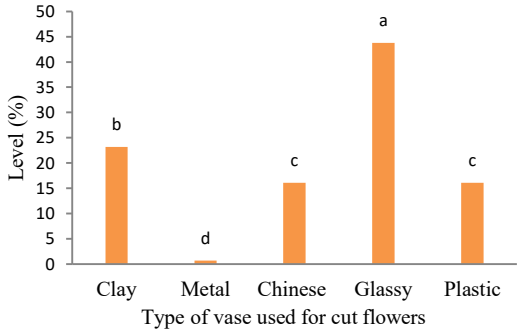

Fig. 6. Type of vase used to maintenance of cut flowers.

There was no consensus about the replacement of the vase water. Data shows that 20.2 percent of respondents do not replace vase water at all, but 31.8 percent replace it when it blurs (Fig. 4). In addition, 29.5 percent said that they do not wash the vases at all, 62.5 percent wash them only with water, and 8.2 percent use disinfectants in their washing (Fig. 5). The replacement of vase solution at the intervals of at least three days is necessary (Van Doorn & Peirk, 1990) because if microbes propagate in the vase solution, they will block the flower veins and thereby they will disrupt water relations of the flowers and reduce their vase life (Bleeksma & Van Doorn, 2003). Danaie et al. (2011) reported that the replacement of preservative solution of cut gerbera flowers that contained ethanol improved their vase life and some physiological traits. Also, Mohammad Khani and Rohi (2008) found that daily

replacement of preservative solution of cut roses extended their vase life significantly as compared to its replacement other day. Clean water plays a critical role in enhancing the vase life of cut flowers. The containers should be washed with disinfectant powders and should be rinsed with hot water. The microorganisms remaining in the pots start to propagate as soon as fresh water and flowers are added (Ebrahimzadeh & Seifi, 1998). In a study on different rose cultivars, Laird et al. (2003) found that their longevity was enhanced when water and disinfected vases were applied, but when the vases were infected, the petals wilted earlier.

According to the results about vase type, the highest and lowest frequencies were related to glass (40.4 percent) and metal (0.7 percent) (Fig. 6). Metal containers inactivate some compounds of the preservatives (Ebrahimzadeh & Seifi, 1998). We found that very few respondents used metal containers, which is desirable.

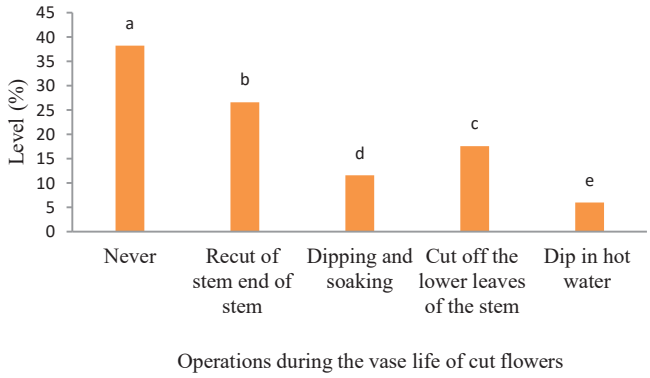

Fig. 7. Perform different operations during the vase life of cut flowers.

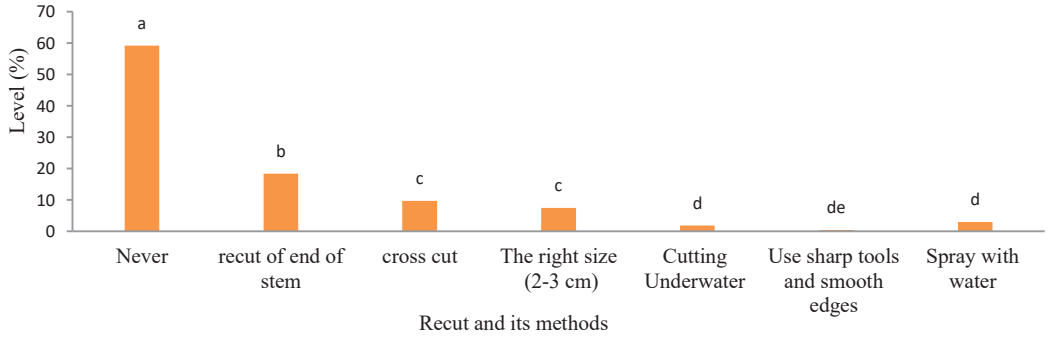

Fig. 8. Amount of recut and its method on cut flowers during its vase life.

It was found that 38.2 percent of respondents conducted no operation on the flowers over their vase life. Also, it was revealed that 26.6 percent cut the stem end, 11.6 percent used immersion and soaking, 17.6 percent cut the lower leaves, and 6 percent used soaking in hot water (Fig. 7). It is crucial to remove the leaves at lower parts of the stem before placing the flower in the solution-containing vase because leaves decay under the water fast (Ebrahimzadeh & Seifi, 1998). For example, when the leaves on rose stems are immersed in the solution, polyphenols move from the leaves into the water, augmenting the blockage of the veins (Edrisi, 2008). Sometimes, the flowers offered in flower shops look wilted which is related to water loss during the process of growing until its sale by retailers. Flowers like roses, chrysanthemums, and gerbera may be refreshed if their stem ends are placed in hot water for 60 seconds (Ebrahimzadeh & Seifi, 1998). Our findings show that only 59.6 percent of respondents perform the operation of the removal of the wilted flowers. The wilted flowers will produce ethylene if they are left on the stems (Jowkar et al., 2009) and this ethylene will accelerate senescence. Therefore, it is necessary to remove the wilted florets and flowers.
We observe that 59.2 percent of interviewees do not apply re-cutting operation during flower's vase life. Among the other 40.8 percent who re-cut the stem end, only 1.9 percent performs it under the water (Fig. 8). Van Doorn and Dhort (1994) found that the wilting of cut flowers during their vase life is related to inadequate water uptake due to the closure of the veins by bacteria growth, the sedimentation of compounds like gums, tylose formation, and the presence of air bubbles in the vein system which can be resolved by cutting the ends of the stems. Mortazavi (2010) revealed that stem re-cutting of the cut rose flowers positively influenced their vase life, peroxidase and catalase enzymes, and chlorophyll content. Ornamental sunflower stem must be re-cut at the intervals of three days extends its vase life (Meshkati Jirsaraei & Hashemabadi, 2013). It is recommended to re-cut the stems diagonally in proper size (2-3 cm) under the water with a clean tool (Jowkar, 2006).

CONCLUSIONS

All in all, it was found that flower consumption is not in a acceptable state and people in Gorgan, Iran did not have enough knowledge as to the cut flowers and how to keep them and it was far from the ideal situation. To enhance people's knowledge and improve their vision, it is necessary to perform training and extension works by the relevant officials. Also, in order to improve the life and quality of cut flowers, it is suggested that the appropriate solution be prepared and commercialized by the relevant experts after specialized and necessary tests. However, the authors of this paper have already done the initial steps. It is also suggested that the necessary training on cut flowers, including their value and how they are kept through communication media, are made.

CONFLICT OF INTEREST

The authors have no conflict of interest to report.

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مطالعه‌ای در مورد آگاهی مصرف‌کنندگان و عملیات نگهداری گل‌های شاخه‌بریده درطول عمر گلجایی آن‌ها (در مورد شهر گرگان)

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چکیده:

از آنجایی که بیشتر مصرف‌کنندگان گل‌های بریده به شیوه‌های افزایش عمر پس از برداشت آن‌ها آگاهی ندارند، گل‌های خریداری شده توسط آن‌ها کمتر از حد استاندارد دوام داشته و خیلی زود از بین می‌روند. هدف از انجام این پژوهش بررسی میزان آگاهی مردم شهرستان گرگان نسبت به گل‌های شاخه بریده، میزان مصرف و نحوه نگهداری آن‌ها بود. با استفاده از فرمول کوکران تعداد ۲۶۷ نفر به عنوان نمونه تعیین گردید. روش پژوهش بکار گرفته شده در این مطالعه از نوع توصیفی-پیمایشی بوده است. با توجه به اهداف پژوهش ۱۳ سوال طراحی و در قالب یک پرسشنامه تهیه شدند. نتایج نشان داد که ۳۴/۱ درصد هیچ اطلاعاتی در مورد گل‌های شاخه بریده نداشتند. در بین پارامترها، پس از علاقه، هزینه بیشترین تاثیر را بر انتخاب گل داشت. ۵۵/۱ درصد از افراد، اذعان داشتند که شیوه‌های تبلیغی و ترویجی در مصرف گل تاثیرگذار است. بعلاوه، ۷۷/۹ درصد از افراد فقط از آب برای نگهداری گل‌ها استفاده می‌کردند و فقط درصد کمی به آب، موادی را اضافه می‌کردند. به طور کلی نتایج پژوهش حاضر نشان داد که وضعیت مصرف گل و شناخت مردم شهرستان گرگان نسبت به گل‌های شاخه بریده و نگهداری از آن‌ها ایده‌آل نیست و با استانداردهای مربوطه فاصله نسبتا زیادی دارد. به منظور افزایش سطح بینش و اطلاعات مردم این شهر نسبت به موارد ذکر شده، کارهای آموزشی و ترویجی مورد نیاز است که باید توسط مسئولین ذیربط صورت پذیرد.

کلمات کلیدی: پس از برداشت، عمر گلجایی، گرگان، گل بریده