

Empowerment Program in Pesagi Village Community: Assistance in Compounding Innovative Peel-off Pain Reliever (UNO) Derived from Family Medicinal Plants

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Abstract The abundance of family medicinal plants (TOGA) growing in the yards of the house can be utilized for one of the health products called *boreh*, a traditional medicine used from generation to generation by the Balinese. *Boreh* can be innovated into a peel-off preparation form that has some potential to increase public interest in traditional medicine. The contents of TOGA, such as ginger, turmeric, and galangal in the peel-off *boreh* preparation, may exhibit beneficial effects as a pain reliever. Therefore, the mentioned product can be used to overcome pain problems that are commonly found in the people of Pesagi Village. The ideas related to compounding certain innovative herbal preparations for overcoming health problems in Pesagi Village were carried out through community empowerment activities. A series of program activities took place during January-April 2022. The purpose of this community empowerment program was to provide training and assistance activities to the people of Pesagi Village in the practice of utilizing TOGA as an innovative *boreh* peel-off preparation, namely UNO, with empirical pain reliever properties. Guidance and assistance in compounding practice were based on the results of dosage formulation previously developed by the executive team in the School of Pharmacy Mahaganasha Laboratory. This empowerment program was executed through a learning-by-doing approach, integrated training, participatory practice, and guided mentoring by the executive team with knowledge and skills evaluation (pre-test and post-test, $p=0.000$, 95%). After the empowerment program, the community has been able to practice how to turn TOGA from the ground into a useful product. The innovative products in this empowerment program may offer some potential benefits to overcome certain health-related problems of the community in Pesagi Village, such as joint pain. The success of this program may encourage the sustainability of the program in the future.

1. INTRODUCTION

Family medicinal plants (TOGA) are particular medicinal plants presenting some health properties which can be planted in the yard around the house. These medicinal plants are usually applied for first aid or as mild medicines treating illnesses such as fever, cough, and flu (Wahyuni et al., 2016). TOGA is widely used as raw material for

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traditional medication.

This type of plant has specific properties to increase health in terms of preventive, promotive, and curative efforts based on the respective contents of secondary metabolites. The success of TOGA utilization should be strongly influenced by knowledge from the community about the beneficial medicinal properties of each type of plant (Akbar et al., 2021).

In Balinese society, TOGA has become part of the cultural heritage based on the *Usada papyrus*. The Balinese have used medicinal plants as traditional medicine for hundreds of years (Adiputra & Trapika, 2018; Sardiana et al., 2012). One of the medicinal heritages used for generations by the Balinese for health is *boreh*. The word *boreh* can be equated as *parem*, a fine powder consisting of various spices mixed with some liquid before use (water, vinegar, wine, or particular alcohol). There are three categories of *boreh* in Bali: *boreh anget* (original Balinese *boreh*), *boreh miyik*, and *boreh tis*. For example, the effects of *boreh anget* as traditional medicine include warming up the body, improving blood circulation, and reducing muscle pain, bone pain, fever, shivering, and headaches. Therefore, *boreh anget* is usually used to maintain health (Riantini et al., 2019).

The traditional use of *boreh* often exhibits several obstacles related to its non-durable properties, so *boreh* can be formulated as a peel-off preparation to increase its utilization for health purposes (Riantini et al., 2019). Peel-off preparation is one of the preparation types which are practical to use, can be easily applied for 15-30 minutes, and can be peeled off immediately after dryly set (Sholikhah & Apriyanti, 2020). Compared to the other types of conventional *boreh* preparations, peel-off *boreh* preparation shows the advantage of not wearing off quickly but is easy to clean. The ease of cleaning the peel-off *boreh*,

which resembles lifting or releasing an elastic membrane, may increase public interest in using *boreh* (Isna et al., 2020). With these characteristics, a preparation called UNO peel-off *boreh* has been formulated in powder dosage form by the executive team as a preference for community empowerment programs (Isna et al., 2020; Pratiwi & Wahdaningsih, 2018).

Pesagi Village, located in Penebel District, Tabanan Regency, is one of the villages targeted for community empowerment (Figure 1). Based on its geographical location, this area has great potential in the agricultural sector, so most people's livelihood is farming (Badan Pusat Statistik, 2017). Based on the results of the interview conducted by the executive team with the headman of Pesagi Village, the majority of the people in the village are pre-elderly and elderly groups who often experience joint pain due to their daily work as farmers (Sudana, 2022). On the one hand, the abundance of natural resources such as TOGA in people's yards can be used as ingredients for traditional medicines to overcome health problems in the village. On the other hand, the limited health infrastructures other than public health centers, such as pharmacies or hospitals, which can be visited at any time or are closely located to residential areas, have become an obstacle for quick treatment when people experience pain or other health problems. Therefore, a community empowerment program is needed to accommodate public health problems by utilizing the abundance of natural resources in Pesagi Village (Qamariah et al., 2019; Sudana, 2022).

This community empowerment program aimed to provide some guided training and assistance for the Pesagi Village community, so they would be able to practice the process of TOGA utilization into an innovative preparation in the form of peel-off *boreh*, called UNO, with empirical pain reliever properties. The implementation of this

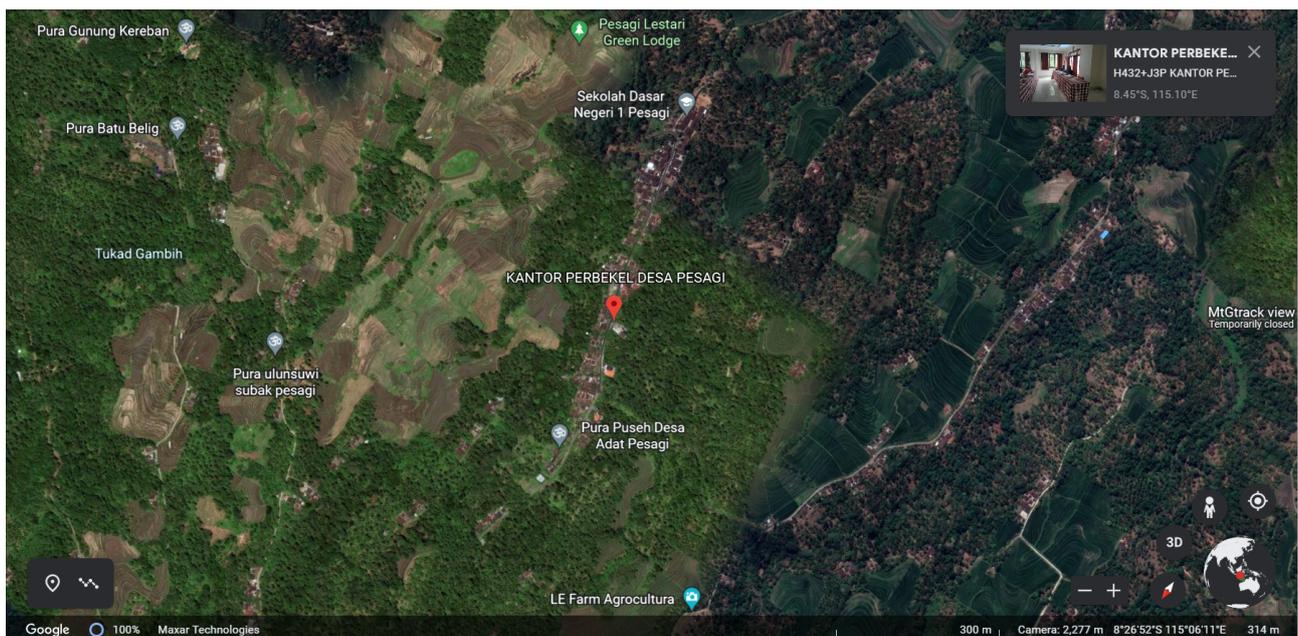


Figure 1. Location of activities implementation

program would be beneficial for overcoming health problems in Pesagi Village, as well as providing entrepreneurial ideas related to economic opportunities through the manufacture of TOGA-based health products. The empowerment activities in the Pesagi Village were carried out through a series of training and technical assistance in compounding UNO peel-off preparation, which the executive team had previously developed.

2. METHOD

This community service activity was conducted in Pesagi Village, Penebel District, Tabanan Regency, Bali. To cope with the problems and situational community needs in Pesagi Village, several stages of preparation and program implementation were carried out. All activities began in early Januari 2022 and ended in early April 2022. The executive team for the whole activities were consisted of eight students and three lecturers, as well as a total of 29 participants attending the peak event on April 1, 2022. These entire activities integrated with the implementation of the Students Service-Learning Program (KKN) held by the School of Pharmacy Mahaganesha under the main theme "Reviving to The Independent Bali with Mahaganesha".

The preparation process included several phases of product formulation and development and characteristics evaluation of the innovative products before they were disseminated. The *boreh* preparation was formulated and developed into an innovative peel-off product, namely UNO, by the executive team containing TOGA-based natural ingredients, such as ginger, turmeric, and galangal (Ariani et al., 2020; Isna et al., 2020). These materials were reported to have empirical effects on reducing pain (Akbar et al., 2021; Cahyawati, 2020; Fahryl & Carolia, 2019). Product characteristics were evaluated in the School of Pharmacy Mahaganesha Laboratory before being demonstrated to the target community of the empowerment program. The characteristics of peel-off *boreh* preparations, such as adhesion, spreadability, drying time, and pH, were confirmed to have fulfilled the requirements for peel-off preparations (Isna et al., 2020; Luthfiyana & Hidayat, 2019).

The program implementation in the community empowerment was carried out in two stages: product knowledge sharing and guided training, as well as assistance in compounding practice. The learning-by-doing approach was applied to the targeted female participants from Family Welfare Empowerment Group (PKK), representing every householder who had a pre-elderly or elderly family. During the product knowledge sharing and training event, participants were facilitated to absorb the learning materials based on the presentation and compounding demonstration provided by the executive team and to experience the preliminary hedonic evaluation for the targeted user community. This event was held on March 17, 2022, in the Pesagi Village Office Hall. Since the training day, the assistance program for product compounding practice had been taking place to provide some opportunities for the participants to understand the

compounding process and identify any related problems. The executive team also accompanied the participatory practice until the participants had successfully compounded UNO peel-off preparation. The peak event of the community service program was undertaken on April 1, 2022, at the same location to observe the success of participants in compounding UNO peel-off *boreh* preparations.

Evaluation of program implementation consisted of measuring participants' knowledge before and after the product knowledge sharing, participants' skills before and after training, and the overall participants' satisfaction with the program. The three measurements used a self-made questionnaire instrument and had met the validity test based on the item-content validity index (I-CVI) value of 1,000 and Cronbach's alpha value > 0.800. The knowledge level questionnaire consisted of a total of 10 questions related to Family Medicinal Plants based on their definition, examples, health benefits, and usage in innovative dosage forms (no. 1-4), types and symptoms of pain (no. 5-7), the innovative dosage form of *boreh* based on the form and how to use it (no. 8-10). Then, the skill level questionnaire also consisted of a total of 10 questions about the preparation process (no. 1-4), compounding of innovative peel-off *boreh* (no. 5-7), and packaging process (no.8-10). Both questionnaires provided the multiple-choice options 'True', 'False' and 'I don't know'. Correct responses were given a score of 1, and incorrect responses were given a score of 0. The option 'I don't know' was considered a lack of knowledge or skill and gave a 0. The satisfaction with program implementation questionnaire consisted of a total of 5 questions containing reliability (no. 1-2), tangible facilities (no. 3), responsiveness (no. 4), and assurance (no. 5) provided by the executive team. This questionnaire has the multiple-choice options on Likert scale '1=unsatisfied', '2= less satisfied', '3=satisfied', '4=very satisfied'. Knowledge and skill level data were analyzed using statistical techniques under the Wilcoxon Test to define the difference in final scores before and after the product knowledge sharing as well as before and after training (for skills) with a 95% confidence level. Meanwhile, the participant satisfaction data was processed by calculating the percentage of the total respondent's achievement from the Likert scale answer. Then the achievement was adjusted to the categories of achievement ('0-54.00% = not satisfied', '55.00-64.00% = less satisfied', '65.00-79.00% = average', '80.00-89.00% = satisfied,' '90.00-100.00 = very satisfied').

3. RESULT AND DISCUSSION

3.1 Preparation process

Peel-off is among several types of topical preparations with some advantages that were relevant for developing an innovative product in this empowerment program. Basically, the peel-off product is applied by hand or a brush and left for a while. This product can dry and tighten, so it allows for removal (Sholikhah & Apriyanti, 2020). The principle of peel-off preparations is their ability to

form a thin film layer when attached to the skin (Agoes, 2015). In this case, *boreh* will easily stick to the skin when applied and is also easy to clean by peeling off after use (Budiman et al., 2017). Based on this principle, the community service team had attempted to formulate UNO *boreh* peel-off powder that signified favorable and practical characteristics.

In the pre-formulation process, the executive team had conducted a literature study to obtain the optimum formula in the compounding of UNO peel-off *boreh* product. Some modifications regarding ingredients and each proportion to the previously available formula resulted in a kind of product tailored to the criteria which community needed (Isna et al., 2020; Riantini et al., 2019; Setiawati & Sukmawati, 2019; Yulia & Ambarwati, 2015). The compounding of innovative UNO peel-off preparation utilized TOGA such as galangal, ginger, and turmeric; each of which contained phytochemical compounds such as essential oils, zingiberol, and curcumin with pain reliever properties (Akbar et al., 2021; Cahyawati, 2020; Fahryl & Carolia, 2019). Therefore, the UNO peel-off *boreh* formulation (Tabel 1 and Figure 2) was expected to be one of the solutions for certain health problems in Pesagi Village.

The readiness of the formula preparation that was presented in the empowerment activities referred to the results of some laboratory tests. The UNO peel-off *boreh* preparation was tested in the School of Pharmacy Mahaganesha Laboratory. This preparation displayed some characteristics such as pH 6, adhesion of 7 seconds, spreadability of 6.5cm, and drying time of 25 minutes. These results indicated that the UNO peel-off *boreh* preparation had fulfilled the requirements of peel-off preparations (Luthfiyana & Hidayat, 2019; Setiawati & Sukmawati, 2019). However, further evaluations, especially certain hedonic tests, are still needed to assess the level of users' likeness and dislikeness or the public's impression towards the product. This outcome would basically enhance product development and further scale-up.

3.2 Program implementation

All the related information about peel-off *boreh* preparation compounding had been delivered along the

Table 1 . UNO peel-off *boreh* formula

	Formula	Function
Turmeric, ginger, galangal, rice	64.3%	Active ingredient (pain reliever)
Gelatin	20%	Film-forming agent
PVA	15%	Film-forming agent
Menthol	0.5%	Cooling sensation
Sodium benzoate	0.2%	Preservative

Table 2 . Demographic characteristics

Characteristics	Number of Participants (n), (N = 29)	Percentage (%)
Sex		
Female	29	100.00
Male	0	0.00
Age		
40 years	19	65.52
>40 years	10	34.48
Educational background		
Not attending	4	13.79
Elementary school	5	17.24
Junior high school	8	27.59
Senior high school	12	41.38
Occupation		
Grocery sellers	2	6.90
Farmers	9	31.03
Housewives	18	62.07



Figure 2 . Making peel-off *boreh* in the laboratory

training event in Pessagi Village The training activities applied some method in the form of education and presentation related to TOGA utilization for 29 participants (Tabel 2 & Figure 3), as well as the compounding procedure of UNO peel-off preparation (Figure 4). After the training ended, the community was finally covered with some useful knowledge regarding how to process TOGA around the yard into some advantageous health product as an alternative treatment.



Figure 3 . Presentation about the TOGA utilization and the innovation of UNO peel-off *boreh* preparation

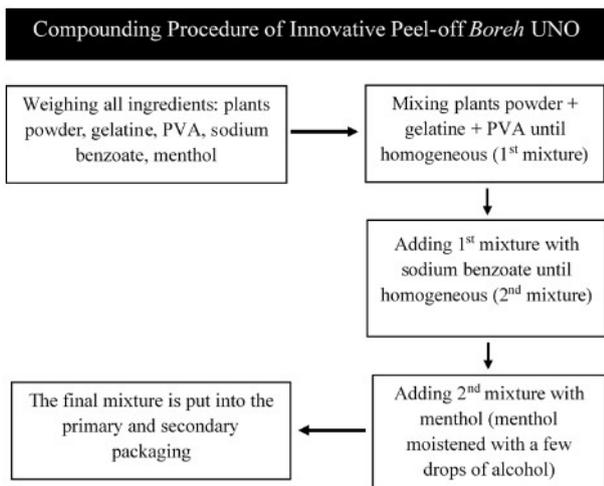


Figure 4 . Compounding procedure of innovative UNO peel-off boreh preparation

To increase the participants’ understanding during the training program, demonstration method was applied. The demonstration included the introduction of the necessary tools and materials (Figure 5), the method of compounding the preparation and the packaging of the peel-off boreh preparation (Figure 6). Demonstration of compounding practice by the executive team allowed the participants to directly practice making the peel-off boreh. Before the training ended, the participants also experienced direct topical application of the demonstrated product assisted by the executive team (Figure 7). The impression from the participants indicated that the product



Figure 5 . Tools and materials used in making UNO peel-off boreh preparations



Figure 6 . Demonstrated practice of UNO peel-off boreh preparation by the executing team



Figure 7 . Application of peel-off boreh preparations to the community (March 17 2022)



Figure 8 . Participants grouping in the compounding practice of UNO boreh peel-off preparations

formulation was well accepted and responded to by the public as a preliminary hedonic test. After the demonstration, the community was expected to be able to practice the making of peel-off boreh preparation through a follow-up program in the form of guidance and assistance afterwards.

Guidance and assistance played roles as strategies in the community empowerment process. Assistance is an adequate activity to encourage optimal community empowerment (Samadikun, 2018). In this program, the focus of the empowerment process was in the form of human resource development, especially for the entire PKK representatives in Pesagi Village, to practice the compounding of innovative UNO peel-off preparations.

To achieve effective mentoring and assistance purposes at the peak event, the participants were divided into three major groups (Figure 8), in which each group was accompanied and guided by some members of the executive team. Previously, the participants had been guided regarding TOGA utilization process, starting from handling raw materials into the processed materials that were ready to be compounded as peel-off boreh preparations, as well as the strategy to obtain other necessary excipients.

In each of the participant groups during the main event of the community service in Pesagi Village, the implementing team focused on two aspects: instructive guiding and assisting the independent practice of the community. The peak event began with preparing the necessary tools and materials provided by the executive team. Participants were subsequently directed to pick and weigh up the materials needed in the practice of

The peel-off powder preparations were first dissolved with warm water. The ratio between the powder quantity and the water solvent was 1:1. The diluted preparation was then applied to the painful area. The preparation would dry for approximately 15 to 30 minutes. After drying, the peel-off *boreh* preparation formed a layer like an elastic membrane, which could be easily cleaned by exfoliating (Figure 11).

In general, this community empowerment activity had

been successfully implemented. First, the community obtained some insights regarding TOGA and the idea of its utilization to overcome the health problems they were experiencing. There was a significant improvement on the basis of knowledge between pre-test and post-test results of the participants, from a score of 50.00 to 83.45 ($p=0.000$, 95%, (Table 3)). Second, participants with no experience in compounding peel-off *boreh* product were given a chance to practice compounding the innovative product during the

Table 4 . Skills Level Between Pre-Test and Post-Test

No.	Statements	Correct Answers (%)		p-value
		Pre-test	Post-test	
1	Tools to be prepared for compounding peel-off boreh dosage form must be sourced from a laboratory.	58.62	100	
2	A bowl and spoon can be used to compound peel-off boreh dosage form at home.	37.93	96.55	
3	Materials needed to compound peel-off boreh dosage form consist of a mixture of Family Medicinal Plants and excipients.	44.83	86.21	
4	The mixture of Family Medicinal Plants should be powdered in advance for an easy compounding process.	44.83	89.66	
5	Weighing is the second step in the compounding process of peel-off boreh.	34.48	82.76	
6	Menthol is added after the mixture of plant powder, gelatine, and PVA is formed.	17.24	79.31	
7	Alcohol should be dropped on the menthol before being put into the second mixture.	17.24	72.41	
8	A suitable packaging for peel-off boreh product consists of a primary and secondary pack.	37.93	68.97	
9	Peel-off boreh product is put into paper wrap then plastic wrap.	55.17	75.86	
10	Every package of peel-off boreh product is labelled with the date of manufacture.	31.03	51.72	
Average(%)		37.93	80.34	0.000*

*Significance based on 95% level of confidence under Wilcoxon Test

Table 5 . Participants' Satisfaction Level

No.	Statements	Respondents' Total Achievement (%)	Category*
1	The executive team had informed about workshop materials clearly and understandably.	80.23	Satisfied
2	The empowerment program had been executed in sufficient time.	84.21	Satisfied
3	The program was provided with appropriate media (presentation slides, brochure, and demonstration tools) to support the program's success.	80.23	Satisfied
4	The executive team provided answers to the participants' questions during the activity program.	88.18	Satisfied
5	The executive team has shown hospitality and good manner during the program.	88.16	Satisfied

*Categories of Achievement: 0-54.00 = Not Satisfied; 55.00-64.00 = Less Satisfied; 65.00-79.00 = Average; 80.00-89.00 = Satisfied; 90.00-100.00 = Very Satisfied

training event. Accordingly, the results on skills level improved from pre-test to post-test (score 37.93 to 80.34, $p = 0.000$, 95%, (Table 4). Third, during the process of compounding the product, the community of Pesagi Village were very enthusiastic in participating in the entire activity and trying on the peel-off *boreh* they compounded (Figure 11). In addition, during the program implementation, there was positive interest and satisfaction in the targeted community in participating in the empowerment activities (Figure 12). Satisfaction achievement shown by the participants had reached between 80.23-88.16% (Satisfied) (Table 5).

A part from the successful implementation of the activities, there were still some obstacles during the implementation of the program. The situation and condition in the countryside had less supported the existence of an analytic scale to measure the amount of material for compounding. The executive team had managed to overcome this issue by converting the dose by using the tablespoon as a standard measurement. Furthermore, the community initially did not understand how to mix the ingredients by using a mortar and stamper, so the group assisting team patiently explained how to use the correct technique. As the process continued, the community gradually got used to the rhythm and finished it according to the guidance from the executive team. In the end, these community empowerment activities in Pesagi Village had provided benefits in the context of knowledge and skills improvement that may be continued in the future, in terms of entrepreneurship workshops in Pesagi Village, or as program expansion in other relevant locations.

4. CONCLUSION

The executive team have successfully implemented a series of community empowerment programs in Pesagi Village through training and assistance activities. The people of Pesagi Village have gained some insight and ideas regarding TOGA utilization to overcome their common health problems, specifically pain, through the innovative UNO peel-off *boreh* preparation. Guidance and assistance activities facilitated the targeted community's skills improvement in compounding TOGA-based pain reliever peel-off products. Community acceptance of this program might allow the sustainability of the program in the future by deepening the entrepreneurial skills perspective.

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CONFLICT OF INTERESTS

The authors stated that there was no conflict of interests during the empowerment program and article publication process.

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