

**DEVELOPMENT OF VIDEO MODULES FOR
CREATING AWARENESS ON SAFE AND JUDICIOUS
USE OF CHEMICALS AT HOUSEHOLD LEVEL**

Thesis

**Submitted to the Punjab Agricultural University
in partial fulfillment of the requirements
for the degree of**

**MASTER OF SCIENCE
in
EXTENSION EDUCATION AND COMMUNICATION
MANAGEMENT
(Minor Subject: Sociology)**

By

**JASBIR KAUR
(L-2019-CS-360-M)**

**Department of Extension Education and Communication Management
College of Community Science
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LUDHIANA- 141004**

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CERTIFICATE I

This is to certify that the thesis entitled, “**Development of video modules for creating awareness on safe and judicious use of chemicals at household level**” submitted for the degree of **M.Sc.** in the subject of **Extension Education and Communication Management** (Minor subject: **Sociology**) of the Punjab Agricultural University, Ludhiana, is a bonafide research work carried out by **Jasbir Kaur (L-2019-CS-360-M)** under my supervision and that no part of this thesis has been submitted for any other degree.

The assistance and help received during the course of investigation have been fully acknowledged.

(Dr. Kanwaljit Kaur)
Major Advisor
Professor
Deptt. of Extension Education and
Communication Management
Punjab Agricultural University
Ludhiana-141004

CERTIFICATE II

This is to certify that the thesis entitled, “**Development of video modules for creating awareness on safe and judicious use of chemicals at household level**” submitted by **Jasbir Kaur (L-2019-CS-360-M)** to the Punjab Agricultural University, Ludhiana, in partial fulfillment of the requirements for the degree of **M.Sc.** in the subject of **Extension Education and Communication Management** (Minor subject: **Sociology**) has been approved by the Student’s Advisory Committee along with External Examiner after an oral examination on the same.

(Dr. Kanwaljit Kaur)
Major Advisor

(Dr. Ram Chand)
External Examiner
Former ADG, ICAR

(Dr. Kiranjot Sidhu)
Head of the Department

(Dr. Sandeep Bains)
Dean, Postgraduate Studies

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Place:

Dated:

(Jasbir Kaur)

Title of the Thesis : Development of video modules for creating awareness on safe and judicious use of chemicals at household level

Name of the Student and Admission No. : Jasbir Kaur
(L-2019-CS-360-M)

Major Subject : Extension Education and Communication Management

Minor Subject : Sociology

Name and Designation of Major Advisor : Dr. Kanwaljit Kaur
Professor

Degree to be awarded : M.Sc.

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Punjab, India

ABSTRACT

The rural women play an important role in managing major household activities. Due to their involvement in farming and household activities, they are exposed to poisonous chemicals in daily life. There is a need to encourage them to adopt corrective measures to minimize the use of chemicals during the performance of day to day activities. In this context, study was conducted to identify different household practices on safe and judicious use of chemicals at household level. On the basis of 30 identified practices, a knowledge test and video modules were developed. A knowledge test was administered on 100 rural women of Ludhiana district of Punjab. After that, prepared video modules were shown to the women through WhatsApp message. Post knowledge scores of the video modules were recorded. Comparison of pre and post knowledge scores showed that significant change was seen for all major practices related to safe and judicious use of chemicals at household level. The overall significant change in mean knowledge score for all five major practices was 42 per cent. After video exposure, percentage of the respondents in high level of knowledge category was shifted from 2 to 77 per cent. So, prepared video modules are proved to be effective for creating awareness among people regarding safe and judicious use of chemicals at household level.

Keywords: Safe household practices, video modules, knowledge level, gain in knowledge.

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Signature of the student

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CHAPTER - I

INTRODUCTION

The chemicals industry is highly diversified in India. It covers more than 80 thousand commercial products. It is an essential element of the Indian Economy. India provides three per cent to the global chemical industry and it ranks 6th in chemicals sale in the world. The Indian chemical industry enrolls more than two million people. A Chemical is a material or compound, which is artificially purified or prepared. The chemicals are shed from a host of common products, from flooring to electrical goods as well as beauty and cleaning products. We think our homes are a safe haven but unfortunately they are being polluted by toxic chemicals from all our products (Davis 2016).

Chemicals have become an integral part of our daily life. Many household chemicals are being used in performing different activities. Household chemicals are non-food chemicals, which are used for cooking, storage, cleaning, maintenance and hygiene (air freshener, bleach, conditioner, deodorant, insect-repellent, disinfectants, etc.) These exist as solids, liquids, gas, and plasma. If they not properly used or stored, these chemicals could cause minor to serious health problems (Mustapha *et al* 2017). Most of the plastic containers, which we use in our kitchen are lined with synthetic material likewise bisphenol A (BPA). According to the researchers, these synthetic chemicals are hazardous to human health. Now, many of the toys of children and their feeding bottles are bisphenol A (BPA) free, but they are not free from other chemicals (Shaw 2011).

These synthetic chemicals play a crucial role in food production and its preservation. Depending upon the synthetic chemicals, artificial preservatives prolong the shelf-life of foods whereas artificial synthetic colours make the food more appealing. Everyday people are consuming appetizers, which affects the human health. Some chemicals are also used during storage, transport and production of food products. It comprises pesticides, preservatives and colouring substances, animal drugs and substances in packaging materials (Anonymous 2019). The use of food additives is only justified when their use has a technological need, doesn't mislead consumers and serves a well defined technological function, such as to preserve the nutritional quality of the food or enhance the stability of the food. There are several thousand food additives used, all of which are designed to do a specific job in making food more appealing (Anonymous 2018).

In the modern era, production of agriculture has expanded the chemical load on natural ecosystems. In order to protect plants and humans from various diseases, pesticides are used in agricultural lands, community health programmes and urban green

areas. Affects of chemicals can be found in our daily foods, cooked meals, animal feeds, and wine, water and fruit juices. Furthermore, researches showed that residues affects in vegetables and fruits cannot be completely removed by thorough washing and peeling method (Stamati *et al* 2016).

Sanitation plays an important role in our day to day life. It keeps the surroundings clean and dust-free, which helps to reduce the spreading of germs and help extend the life of our belongings (Todorovic 2018).

To eliminate the clothes moths, mostly mothballs are used. Sometimes, due to loose-fitting of the containers, the pesticide vapours assemble in living spaces where domestic pets and people can breathe them in for long periods of time, which may cause dangerous poisoning (Leverette 2021).

In 2021, consumers are very conscious regarding the use of skin care products. Now days, they have started reading the instructions given on the packaging of products than ever before. Sale of 30 chemicals used for beauty & grooming products are banned by state departments like the U.S Food and Drug Administration. If these products are used for long time, it may cause major threat to health and environment. According to the constitution, to save both health and surrounding environment should be regular feature of the state. Mostly people are not aware about the chemicals which are found in household products and their ill-effects & threats to the environment (Clayton *et al* 2012). Further, many household chemicals if not handled properly, are destructive in nature that can damage the property of the product and caused health injury. Some household chemicals are flammable which can cause fires or explosions. To overcome these risks, the household chemicals should be used and disposed off safely (Koukel and Griffiths 2019).

About 4.3 million people die every year due to the pollution of indoor household chemicals (Apte and Salvi 2016). The unscientific approach in chemical usage, which threatens consumer's safety, environmental quality, and food security, needs to be curbed. This calls for collaborative action by industry, government, and research institutes to obtain background data, enact appropriate legislation, promote the awareness regarding chemical hazards and ensure training and supervision of agricultural and extension workers. Even consumption of small quantity of these chemicals can raise the body fat. The unconsidered use of chemicals poses ill effects on human health. Numerous products used each day inside the home as well as garden and lawn products contain dangerous chemicals. All purpose cleaners, ammonia based cleaners, bleach, dishwashing cleaners, oven cleaners and toilet cleaners may contain dangerous chemicals that cause irritation when they come into contact with the skin. The vapours of these chemicals like chlorine and ammonia are very prickly and annoying to the eyes, nose and airways and may cause a burning sensation, coughing, gasping, shortness of breath, laryngitis and watery eyes

even at the low levels, especially with inadequate ventilation. The hazardous materials in these products are harmful to the public health and the environment when improperly used or disposed (Anf H. Ziadat *et al* 2010).

In our country, the chemicals detected in the samples of cereals, vegetables, milk, and milk products are very high. We may be exposed through misuse or by accidents in our homes and be contaminated by consumer products including food. Chemicals can be found in a huge variety of everyday beverages and foods (cooked food, fruit juices, wine, refreshments, water, animal feeds, etc.) Skin, mouth, and lungs are the main routes of chemical entrance into the body. Peeling and washing cannot remove the chemicals properly. There are concerns about health effects and prenatal exposure in children. Exposure to chemicals has been affiliated with adverse health effects like birth defects and cancer resulting in hundreds of fatalities. Some chemicals cause decline in sperm counts in males and ovulation in females that result in birth defects. Chemicals usage has become a great hazard to human health. Studies have shown that chemicals affect the human endocrine and immune system. Children who are exposed to chemicals, they may have risk of developing blood cancers such as lymphoma and leukemia increases significantly. According to Sarwar 2016, a significant correlation was found between chemical exposure and children brain tumors.

Chemicals poisoning is more indicative in developing countries compared to developed countries. Most chemical accidents have a limited effect. Many chemicals can be used safely and effectively when labeled instructions are followed. There are also many dangers associated with the application of chemicals. Headaches, nausea, rash and skin irritation are adverse effects of chemicals exposure. Chronic effects of chemical exposure become apparent over time and may result in cancer, reproductive and nervous system problems, and organ damage. Storage and poor use of chemicals especially in poor settings have arrived at health burden. It causes negative impacts on the health of the applier and also affects the health of other residents in danger. These risks may be aggravated by attitude and perception of people regarding the use of chemicals, lack of information on chemicals, and poor knowledge for safe use of practices of chemicals for performing the different household activities. Indians have the distinction of having the highest chemicals in their food (Kaur 2002).

The household environment is broadly supposed to be the most prevailing chemical-treated indoor environment, where the inhabitants themselves apply the chemicals directly or indirectly. It creates indoor contamination and has the potential to cause human poisoning which are major health and environmental challenges. The steady increase in volume and the number of chemicals in the market also increases the risk of exposure to the environment. It also affects the quality of air, soil, and water. It worsens

the ecological environment. Soil is the contact medium among chemicals, agricultural products, atmosphere, water, food, and human health. Chemicals in the soil can be permanent, gradually decomposing to become a source of pollution. Sooner or later, many harmful chemicals end up in the environment as wastes or residues that pollute water, food, air, and soil. Therefore, it affects the whole population.

The rural women play an important role in managing major household activities. Since rural women are processors, consumers, producers and protectors of farm produce, they are constantly in contact with chemicals. Thus they become vulnerable to chemicals related to health risks. The role of women in chemical usage and consumer safety is of special significance. Simultaneously they are the producers and consumers of agro-related household commodities (Jand 2001). Due to their involvement in farming and household activities, they are exposed to poisonous chemicals in daily life. Therefore, it is necessary to provide scientific knowledge to women regarding the safe and judicious use of chemicals in household activities. There is a need to encourage them to adopt corrective measures to minimize the use of chemicals during the performance of day to day activities. Therefore, with this background in mind the present study entitled, “Development of video modules for creating awareness on safe and judicious use of chemicals at household levels” has been designed with the following objectives:

1.1 Objectives of study

1. To identify practices for safe and judicious use of chemicals at the household level.
2. To develop video modules on identified practices.
3. To assess the effectiveness of developed video modules.

1.2 Knowledge gap

Earlier investigations related to this study were conducted to assess the awareness of farm women about pesticide residues. However, very few studies have been conducted on the identification of practices for safe and judicious use of chemicals at the household level.

1.3 Significance of Study

The present study was an attempt to identify major and sub-practices for minimizing the adverse effect of chemicals at household level. The study explored the existing knowledge of respondents regarding safe and judicious use of chemicals at household level. These findings will be helpful in specifying the sub-practices related to judicious use of chemicals in which awareness can be created. Developed video modules can be effectively used by extension professionals for creating awareness among masses regarding safe and judicious use of chemicals at household level.

1.4 Limitations of Study

- i. The investigation was carried out only in Punjab state; therefore the result of the

study cannot be generalized for other states.

- ii. The study was limited to selected practices at household level.
- iii. The present study is being undertaken as a student research programme and hence it has usual limitation of resources, particularly time and money.
- iv. Gain in knowledge of the respondents was measured on the basis of knowledge test. Although sufficient care was taken to minimize errors while administrating the knowledge test, but possibility of such error cannot be completely ruled out.

CHAPTER - II

REVIEW OF LITERATURE

The research related to investigation entitled “Development of Video Modules for creating awareness on Safe and Judicious use of Chemicals at Household Level” has been reviewed in this chapter. Keeping in view the objectives of the study, the review has been presented under the following sub-headings:

2.1 Effectiveness of media

2.2 Studies related to the use of pesticides and chemicals

2.1 Effectiveness of media

The World Bank (1998) developed special booklets and posters to focus training on correct usage of pesticides. These communication materials consisted of pictures or pictographs, logos and symbols. The finding revealed that respondents could recognize logos and symbols portrayed on pictographs and these educational and communication materials proved to be effective in enhancing understanding.

Prabhakar (2000) studied the effectiveness of five communication media namely lecture with discussion, printed material with discussion, group meetings and print media with discussion, visual and printed material with discussion and video films and printed material with discussion for educating farmers about improved wheat production technology. The findings revealed that the video films and printed materials along with discussion were found to be the most effective media followed by the visuals and printed material: group meetings and printed material. The minimum gain in knowledge was noticed through lecture along with discussion and hence this method was rated poorest method of communication. The video films and printed materials along with discussion were found to be the most effective media of communication for creating awareness among wheat growers.

Jand (2001) developed visual communication materials for scientific orientation towards the health hazards of pesticides and reported that visual communication material was very effective. She suggested that the message content of the pictographs should be translated in vernacular language for use with the rural audience and the pictographs are recommended for use as an educational game for self-learning.

Nayak (2001) conducted a study on “Effectiveness of animal husbandry television programme” and revealed that the clarity of the film was excellent for most farmers i.e. 75.00 per cent and about 78.00 per cent of the respondent considered audio-visual combination good.

Puri (2001) conducted a study on development of demonstration kit on nutrient enhancement of cereals and pulses. She revealed that the developed demonstration kit consisting of instructional materials i.e. booklet, photographs, synchronized slide tape

sequence and actual specimens was effective for training neo-literate, semiliterate and illiterate women on nutrient enhancement of cereals and pulses.

Pandian *et al* (2002) conducted a study on “Video education a tool for knowledge gain” and found that video education to farm women was about 60.4 per cent substantial gain in knowledge after watching video education programme which makes a total 65.54 per cent as compared to the pre-exposure stage(5.17%).

Zhang *et al* (2004) conducted a study on models of six information dissemination media, including short messages, cell phones, micro blogs, news portals, television, and oral communication. It showed that SMSs had the maximum speed while cell phones can broadcast more detailed information because verbal communication allows a good explanation of complex conditions. Television had a maximum amount of trust with higher information coverage. Oral communication was not understanding in information dissemination speed as compared to other information media.

Salem *et al* (2008) conducted a study “Communication for better health” in which they found that radio, television and mass media, have a bigger influence on people’s behavior, awareness and attitude regarding reproductive health through different programs.

Zossou *et al* (2009) attempted to compare the conventional training based on two day community workshops and farmer-to-farmer video used as methodologies for the dissemination of improved rice parboiling process in Benin. The study was conducted on 160 women processors using focus group discussions, participant observation, semi-structured interviews and photography. Findings showed that farmer-to-farmer video reached more women who parboiled rice (74.00%) compared to those reached by conventional training (27.00%). The video shows successfully touched a much larger number of women and helped them to disseminate and invoke response to the technology within the community. More than 95.00 per cent of those who watched the video adopted drying their rice on tarpaulins and removed their shoes before stirring the rice, compared to about 50.00 per cent of those who received traditional training and did not watched the video. It was also revealed that majority of the women (89.00%) strongly appreciated the farmer-to-farmer video.

CIBER (2010) explored whether social media was affecting the researcher's work by surveying two thousand researchers across the globe (from 215 countries) that are using social media to assist in their research activities. It found a huge discrepancy between high awareness of social media tools within the research community and low levels of the real use of the majority of social media tools.

Proctor *et al* (2010) analyzed prevailing attitudes and patterns of adoption of social media and identifying constraints, needs, and aspirations of researchers. It revealed that the

researcher's involvement in collaborative research activities positively altered the use of social media. Researchers who participated in wider, discipline-based research networks also utilized social media tools more frequently (57% frequent users) and researchers who participated in informal local research networks (55% frequent users).

Van *et al* (2010) stated that open-air video-presentations facilitated without supervision learning liberate localized creativity and experimentation and build confidence, trust, and group cohesion among rural people including women, poor, and youth.

Wilson *et al* (2010) analyzed the effect of the medium on presentation on recalling the information on asthma. The effect of take-home materials given to the patients after the presentations was also evaluated. The study was conducted on 435 respondents in Chicago, Illinois. One group of the patients was subjected to video-based materials, the other group was subjected to print materials and the last group was the control group which received no information. Out of the patients, half of the video based and all print material-based were given take-home materials. The results of knowledge test done after a week highlighted that the performance of the video-based and print material based groups was much better than the control group. Immediate assessment after giving information through print material and the videos revealed that patients who were given video-based information performed way better than the ones given printed materials. It was concluded that such interventions can assist in recalling information, also reviewable materials can contribute much in enhancing retention of people.

David and Asamoah (2011) studied "Video as a tool for agricultural extension in Africa: a case study from Ghana" and found that video viewing clubs training appreciably improved farmers' knowledge and farmers' perception of changes in their practices which further provided the positive impact of training.

Kapoor (2011) studied the role of mass media in promotion of environmental awareness and revealed that approximately 40 per cent of the respondents preferred Television programmes and 26 per cent of the rural population showed their interest in Radio programmes. He further observed that 66 per cent of the rural people were uneducated and ratio of illiteracy was higher for female.

Shanthy and Thiagarajan (2011) examined the effectiveness and perception of Computer multimedia compared with traditional approach for training sugarcane growers in ratoon management practices. A CD-ROM was developed as multimedia resource to support the training process. Three modes of messages delivery were used i.e. traditional lecture alone, lecture followed by multimedia and multimedia alone. They found that the group which was exposed to lecture followed by multimedia had better knowledge gain and learning index. The group which had received instructions through lecture followed by computer multimedia had a better adoption rate.

Stephens and Rains (2011) studied the impact of using different sequences of information and communication technologies (ICTs) in delivering repeated messages in the context of an interpersonal influence attempt. For the study 140 undergraduate students of two large southwestern universities were chosen. Respondents were exposed to two persuasive messages encouraging them to use the University's Career Service facility. It was concluded that perceived information effectiveness, attitudes and behavioral intentions could be increased by using complementary ICTs to deliver a repeated message rather than using the same ICT.

Sasikala *et al* (2012) developed a multimedia compact disc (MCD) to analyze its effectiveness in terms of knowledge gain on scientific pig farming practices. MCD was shown to pig farmers to check the knowledge gain through pre and post test. It revealed significant difference with respect to mean knowledge scores and the farmers gained overall knowledge of pig farming practices about 32.56 per cent.

Suleiman *et al* (2012) examined the use of ICT as a tool for enabling innovation in South Asia. It found that the potential of ICT as a communication tool had not been properly exercised. They suggested that ICT tools could be used more effectively by acknowledging and integrating the roles of intermediaries and their capacities for innovation so that communities can make possible use of the information provided.

Cai (2013) conducted a study on "Testing the effectiveness of video to complement or replace the lecture/demonstration group training approach for farmers in Kamuli District, Uganda" and found that the video was an effective complement and a substitute for traditional training demonstration through conference/performance. Further, it revealed that training method, which includes a video and a conventional lecture performance, was especially effective for groups with no prior knowledge of the training subject matter. Video or video plus traditional lecture performance was as effective as conventional training to reduce the learning gap.

Bentley *et al* (2014) examined that there has been a top-down approach in the use of ICT tools for agricultural extension in Mali and Burkina Faso. Results showed that farmers and local extension officers also found other promising and already existing technologies (such as video on mobile phone and Bluetooth) that stayed fundamental unused in agricultural extension in Mali and Burkina Faso.

Meena *et al* (2014) studied the effectiveness of digital multimedia video discs in gaining knowledge of improved techniques of dairy farming in which the majority of respondents were found effective with the usefulness of improving knowledge, the relevance of information to ground conditions, the enhancement of confidence, and the increase of curiosity and interest, relevance and content.

Cooper (2015) conducted a study on the use of instructional videos to teach clinical

skills is an ever growing area of online learning based upon observational learning which was cited as one of the strategies for most basic but most powerful learning strategies. The aim of the present study was to assess the effectiveness of online educational videos for the acquisition and demonstration of cognitive, affective and psychomotor skills in university students, through formative assessments with two different durations of educational videos. Research suggested that the use of videos to support traditional learning should be encouraged. Although a conclusive evidence base for their usage has not yet been established they are a means that likely to benefit a part of a cohort, and are highly unlikely to interfere with student learning.

Sharma (2016) analyzed the effectiveness of multimedia modules in terms of knowledge gain and retention among exposed dairy farmers. Knowledge scores were assessed at pre and post exposure stages. It found that there is significant difference with respect to knowledge gain among dairy farmers with respect to scientific dairy farming practices. The results indicate the importance of multimedia modules in transfer of knowledge on scientific dairy farming practices.

Kumari (2017) concluded that the level of awareness before the intervention of the WhatsApp package on prevention of Anemia was medium. After the intervention, the level of awareness observed high. It was found to be effective media for the dissemination of any information instantly.

Singh (2017) revealed a significant gain in knowledge of respondents about different farm practices viz. Seed treatment, soil testing and leaf color chart have been observed after watching videos. He further revealed that 41 per cent of respondents adopted recommended practices of soil testing, 33 per cent of farmers adopted leaf color chart and half of the respondents the seed treatment practices adopted after watching the informative videos. Also majority of respondents had decrease fertilizer application in wheat crop after use of leaf color chart.

Azumah *et al* (2018) examined the effectiveness of various agricultural technology transfer methods. They found a significantly low patronage of the mass media and Information and Communication Technology (ICT) mechanisms such as video, mobile phone, posters, drama and newspapers for communication with rice farmers. They further analyzed that demonstration, farmer-to-farmer, and household extension methods were perceived as the most effective agricultural extension methods.

Batra (2019) developed the package of information on Family Resources Management practices and she found that the package was highly effective in terms of creating awareness.

Paavizhi *et al* (2019) conducted a study on effectiveness of video assisted learning modules. They found that the usage of short video clips allows more efficiency in thinking

and recall process. The visual and the audio combination in the videos had allowed for most of the users for the process of information in a natural way.

To explore the potential of video on mobile phones as a tool to facilitate the diffusion of new agricultural technologies, Sousa *et al* (2019) conducted a study in Mali, Africa. Three videos (First video dealt with the production and use of a bio-pesticide using *Neem* and hot pepper; second video compared three different ways of applying compost uniformly, in rows, and in pockets; third video focused on intercropping cereals and legumes) showing agricultural innovations for sustainable production were shown and shared with 200 farmers in twelve villages in Mali using Bluetooth technology at no cost to the farmers. Face to face interviews were conducted with farmers with whom the videos were shared. Findings revealed that among 148 farmers who watched the video, 60.10 per cent of them had adopted at least one of the video's innovations. The study also states that mobile-phone videos could enhance information transfer, expand outreach and was found to be understandable for illiterate farmers.

Haque and Hoque (2021) conducted a study to ascertain the perception of farmer's about the extent of ICTs effectiveness in the transmission of farming related information. The study also aimed to find out the factors of ICTs effectiveness regarding transmission of farming related information. For the study 250 people (ICT centre service users) were randomly selected from Thakurgaon (Bangladesh). A predesigned interview schedule was used for data collection. Findings revealed that, regarding farming-related information, Union Digital Center was contacted by 57.00 per cent of the respondents whereas government owned ICT center was reached out by only 38.00 per cent of the respondents. A moderate to high level of ICT usage was recorded by majority of the respondents i.e. 79.20 per cent. On the other hand, ICTs were found to be moderately to highly effective in transferring farm-related technology. Regular supply of electricity, high internet speed, conduction of regular ICT trainings etc. influenced ICTs effectiveness.

Nisha (2021) revealed the four informative videos on seed treatment, weed management, integrated nutrient management and safe use of agrochemicals were the treatments in the study and the results show that videos can be used as an effective medium of transferring agricultural information, enhancing knowledge of recommended technologies among the farming community.

Ragasa *et al* (2021) studied the radio broadcasts influence on agricultural technology and crop diversification in Malawi. Radio broadcasts were seen as a good source to advise rural population regarding agricultural and nutrition. Radio broadcasts had a strong positive impact on technology awareness, but a limited impact on the effective adoption of most agricultural practices being promoted. Other components of the interactive programming like listening clubs and call-in services were limited in coverage and effectiveness.

2.2 Studies related to the use of pesticides and chemicals

Awasthi and Yadav (1998) noticed that levels of contamination in sampled vegetables, animal products, oil seeds and fruits were seen to be more severe in India than in developed countries.

Mahapatro and Gupta (1998) studied the optimal use of pesticides leads to efficiency. They further analyzed that if pesticides are used indiscriminately then they decrease the resistance of pests towards pesticides.

Grimaji (1999) found that bovine milk samples used for infants contained pesticide residues. They further found pesticide residues in many green leafy vegetables. The findings suggested eliminating major public health problems through education.

Juhler *et al* (1999) examined that pesticide residues were detected in 10% of 2515 samples with higher incidences of detection for foreign commodities in fruits and vegetables. They further stated that no residues of organophosphorus pesticides were detected in 231 meat samples.

Ramesh and Balasubramanian (1999) revealed that in case of vegetables and cereals the impact of household preparation was very high resulting in 65-95% decontamination of pesticides at different stages resulting in residues well below the toxicologically acceptable limits.

Singh (1999) analyzed the food samples and found most of the vegetables had a high extent of pesticide residues. The cabbage was the most contaminated vegetable followed by 80 per cent contamination in Potato and 60 per cent in Cauliflower.

According to Goel (2000) pesticides have contributed significantly to the public health by improving food security through increased food production and reduced post-harvest losses, and also by reducing human suffering through the control or suppression of vectors of the dreaded diseases like malaria, dengue etc. However, since the pesticides are inherently toxic to living organism, they are also affecting the health of human beings. The study further emphasized that in spite of the numerous advantages of pesticides and insecticides. The residual effect have been found to be encountering in food, feed, fruits and vegetables, cattle and human milk, fat and blood, drinking water and soil and other components of the environment that cause serious concern. It was therefore, suggested for collaborative action and efforts by government, industry, NGO's and research institutes, to obtain background data, enact appropriate legislation, promote the awareness of hazards and ensure training and supervision of the agricultural workers.

Bhagria (2000) tested milk samples for presence of pathogenic organisms and reported positive results, which were linked to the use of agricultural pesticides and insecticides. According to the analysis the residues of DDT, BHC and Alderine were found in milk which was found to be higher than the permissible WHO limits. The findings further

cautioned that these pesticides could cause gastro diseases as well as food poisoning which are harmful for human health.

Kaur (2002) studied the awareness of farm women about pesticide residues in cereals, vegetables, milk, and milk products. The developed booklet for this purpose found to be very effective and appropriate. She stated that the majority of the farm women had a medium level of awareness regarding pesticide residues in cereals, vegetables, milk, and milk products. The findings of the study indicated that the education of farm women was significantly associated with their awareness level. So, more training programs for less or illiterate farm women should be organized.

Mekonnen *et al* (2002) and Tariq *et al* (2004) analyzed that 70 per cent of farmers in developing countries had faced difficulties in reading instructional manuals, leading to the unsafe use of highly toxic pesticides. In Pakistan, there are a relatively high chances of pesticides misused was due to the low literacy rate where majority farming communities cannot read the instructions in the national language (Urdu).

Pandit *et al* (2002) studied the pesticide residues in milk and dairy products in India. They detected trace levels of DDT (dichloro-dipheynl-trichloroethane) and HCH (hexachlorocyclohexane) in the samples. Total HCH levels in milk and milk products samples were lower than DDT levels. They further noticed that butter had higher levels of DDT than cheese and milk powder.

Rahman (2003) showed that farmers with large plantation areas had applied a greater amount of pesticides. He further explained that experienced farmers tend to have used highly toxic pesticides for obtaining quick results.

Freitas *et al* (2005) evaluated the milk exposed to consumption in Northern Brazil. Fifty-six samples (8 pasteurized whole milk, 9 pasteurized skimmed milk, 31 type C pasteurized milk, and raw milk) were evaluated using official methods for physicochemical and microbiological analysis. The results of the physicochemical and microbiological analysis showed results exceeded the limits for the different types of liquid milk samples.

Chai *et al* (2007) determined nine pesticides residues in seven kinds of vegetables in wholesale markets, retail markets, super markets and vegetable production bases in Chongqing, China. The results showed that the pesticide residues in early years were higher than those in at years. The excessive rates of legumes, pepper, tomato and green leafy vegetables were higher that of other kinds vegetables, the pesticide residues of vegetables from markets were higher those from vegetable production bases and pesticide residues of vegetables shipped from outside Chongqing were higher than those of vegetables produced locally. Methamidophos and omethoate were the primary factors affecting the safety of vegetables quality in Chongqing.

Unusan (2007) studied the knowledge and behavior related to food safety among

consumers who had the primary responsibility for food preparation in the home in Turkey. He found significant difference among education levels concerning attitude towards food safety and knowledge.

Singh (2008) studied that majority of vegetable growers were using the recommended insecticides with non-recommended doses, number of sprays, and the time interval between sprays of insecticides on their vegetable crops. So, vegetable growers should be educated through different interventions. He further stated that a large majority of vegetable growers didn't know the importance of B.I.S. specification written on insecticides container. This may be due to a lack of information.

Li and Ren (2008) found that most of the farmers were not aware of the highly toxic pesticide residues and the recommended amount of pesticide. They did not know regarding the withdrawal period.

Huang *et al* (2008) reported that despite knowledge of the recommended amount and methods of pesticide application, farmers were ignoring the correct method of use of chemicals which leads to the accumulation of chemicals in agricultural products.

Zhou & Jin (2009) found that farmers had applied pesticides in excess because they don't know the risks of pesticide residues and the guidelines on how much pesticide to use. It is the main root of pesticide residue problems.

Sharma (2011) studied food safety awareness and practices. He reported that respondents from the high and middle-income category from the urban sector were having better food safety awareness and practices as compared to rural counterparts.

Muhammad *et al* (2012) revealed that overall 40 per cent of cattle milk showed pesticide contamination. Pesticide residues risk analysis was calculated based on provisional acceptable daily intakes and analyzed pesticide residues. These showed that pesticide residues present in milk might pose health problems in the people of this vicinity.

Aslam *et al* (2013) analyzed Organochlorine (OC) residue in the milk of buffalo. Endosulfan was detected in 35 per cent milk samples. The mixture of toxic compounds present in buffalo milk samples might be toxic for infant's nervous, reproductive, and immune systems.

Schettino *et al* (2013) assessed that goat milk was safer for human consumption and it is a good alternative to livestock milk. Continuous monitoring for Hexachlorocyclohexane (HCH) is required through management practices.

Bala (2015) conducted a study on selected household food safety practices of women. She reported that practices of blanching the vegetables to minimize the residual effect were not followed by the large majority of rural as well as urban respondents. Further 50 per cent of rural women were using the celphos tablet to prolong the storage life of wheat and maize grains. She also observed that during the sickness of animals, respondents were consuming

their milk and they didn't know the adverse effect of antibiotics on health.

Rivero *et al* (2015) found that a growing number of environmental pollutants including pesticides increase the spread of tumor growth by altering the normal DNA. Studies indicate that pregnant women in contact with the meager amount of pesticides have passed their lethal effects to the unborn fetus. Another chemical compound chlorpyrifos (CPF) has been shown to induce a redox imbalance when combined with pesticide chemicals. These compounds have known to change the cell defense system antioxidants resulting in the tumor breast cancer.

Shaker and Elsharkawy (2015) reported that fresh milk of buffalo collected from the agro-industrial zone in Egypt was analyzed for Organochlorine pesticides (OCPs) and Organophosphorous (OPPs) by using Gas Chromatography (GC). Five different OCPs and three different OPPs were identified in fresh milk samples. It was found that Malathion and Lindane exceeded the permissible limit set by the European Union. It was concluded that Egypt people are at risk of pesticide exposure. It was recommended that pesticides monitoring programs should be established in all developing countries.

Akhtar and Ahad (2017) developed a mini-review on Pesticides Residues in Milk and Milk Products. Different classes of pesticide OPPs, OCPs, and CBs, etc. were reported in raw dairy milk in different countries and also in Pakistan. They suggested that there is a need to establish pesticide residue monitoring programs for milk analysis for human consumption to improve food safety.

To summarize the studies reported in this chapter it can be said visual aids have significantly contributed in imparting knowledge to rural women and the different parameters included in the visual aids have shown differentiation in their effectiveness. With respect to pesticide related health problems, the pesticide contaminated food commodities and the pesticide residues have raised some alarming findings, thereby suggesting pesticide related health education.

CHAPTER – III

MATERIAL AND METHODS

The present study entitled “Development of video modules for creating awareness on safe and judicious use of chemicals at household level” was conducted by the investigator by following a systematic procedure. The methodological framework adopted for the study has been discussed below under following sub-headings:

3.1 Identification of practices

A search on literature was made to identify the practices for safe and judicious use of chemicals. For this, past research studies, booklets, articles in different newspapers & magazines and books on pesticides were consulted with reference to residual effects of pesticides on health and health hazards caused due to these chemicals. Relevant information was available for developing interview schedule. With the help of major advisor and consultation of Subject Matter Specialist, 36 practices were finalized for knowledge test.

3.2 Construction of research instrument

The tool for data collection was prepared by consulting the relevant literature and experts in the field. The research instrument was divided into two parts. The first part was dealt with personal and socio-economic profile of the respondents. The second part included the knowledge test regarding safe and judicious use of chemicals at household level.

3.3 Construction of knowledge test

The test constituted multiple choice questions. All the items had a score of one for each correct response and zero for incorrect response. Items difficulty index and item discriminating power index was worked out for the finalization of the knowledge test.

3.3.1 Pre-testing of research instrument

According to Gronlund (1970) item analysis helps to determine the effectiveness of each test item by analyzing respondent’s response to the item. The item analysis is usually designed to seek answer to the questions like:

- i. how difficult is the item? And
- ii. how well does the item discriminate?

For this purpose, knowledge test was pre-tested on sample of 20 farm women from non sampled area i.e. village Kandiala, district Tarn Taran. The obtained score of each respondent was computed and arranged in ascending order for item analysis. The procedure involved for measuring the responses on the statements according to descending order of score from highest to lowest. The split half method was used for further analysis of item difficulty and item discriminating power of the statements.

3.3.2 Estimating item difficulty index

Item difficulty was calculated to determine the proportion of correct responses in comparison to the total responses. The difficulty was measured by the percentage of respondents who got the item right. The following formula was used:

$$P = \frac{R}{T} \times 100$$

Where:

$$\begin{aligned} P &= \text{Item Difficulty Index} \\ R &= \text{No. of respondents who got the item right} \\ T &= \text{Total no. of respondents} \end{aligned}$$

On the basis of calculations, item difficulty ranged between 20 to 80. So the statements below 20 and above 80 were rejected.

3.3.3 Estimating discriminating power index

Gronlund (1970) defined discrimination power to the degree to which high and low achievements can be differentiated. Discriminating power of the scale was calculated for each statement separately by using the following formula:

$$\text{Discriminating power} = \frac{R_U - R_L}{T/2}$$

Where:

$$\begin{aligned} R_U &= \text{Respondents in upper group who gave correct answer} \\ R_L &= \text{Respondents in lower group who gave correct answer} \end{aligned}$$

The calculated discrimination power ranged between 0.20 to 0.80 and hence all the statements below 0.20 and above 0.80 were rejected.

On the basis of the technical procedures necessary for constructing the knowledge test, the rigorous exercise was completed and finally only six practices/items were rejected.

3.4 Development of video modules

3.4.1 Development of script for video modules

After finalizing the practices and the development of interview schedule, the development of script is an essential requirement for developing video modules. Before developing script, all identified practices were translated into Punjabi. The script was basically designed to lead the pathway in logical manner. Therefore, the script consisted of outlining the structures and content by arranging text and pictures. Then, it was also shown to the Experts to get their approval.

3.5 Preparation of audio files and video modules

The ability to show video modules can greatly enhance the interest of audience.

Photographs were taken according to the script. Digital camera and mobile phone were used to capture the photographs. Then, the photographs were arranged in a sequence according to the script. The audio files were prepared and then synchronized with text and photographs at appropriate places. Background music was also inserted in the video.

3.6 Testing the validation of video modules

After completing the production of videos, these were evaluated to determine how well it can serve its purpose as per its characteristics/attributes. Three point rating scale was developed to measure the appropriateness of video modules. Then, it was given to a group of 20 judges from the Departments of Extension Education, Extension Education & Communication Management and Communication centre. The judges were requested to judge the appropriateness of video modules on a three point continuum.

For analyzing the appropriateness of video modules, following responses from Subject Matter Specialists of different disciplines were recorded in different responses categories of each character of video modules. Suggestions given by judges were incorporated and video modules were finalized.

Responses of the judges as follows:

Characteristics of video modules	Response categories		
	(Numbers)		
Title	Appropriate (18)	Somewhat appropriate (2)	Not appropriate -
Content	Suitable (19)	Somewhat suitable (1)	Not suitable -
Colour combination	Very Good (16)	Good (4)	Not Good -
Picture quality	Clear (18)	Somewhat clear (2)	Not clear -
Appearance	Appealing (17)	Somewhat appealing (3)	Not appealing -
Synchronization of visual with narration	Synchronized (20)	Somewhat synchronized -	Not synchronized -
Sequence of information provided	Appropriate (18)	Somewhat appropriate (2)	Not appropriate -
Understandability of language	Understandable	Somewhat	Not

	(20)	understandable -	understandable -
Concise/briefing of the content	Appropriate (19)	Somewhat appropriate (1)	Not appropriate -
Cultural compatibility	Compatible (20)	Somewhat compatible -	Not compatible -
Pronunciation	Appropriate (20)	Somewhat appropriate -	Not appropriate -
Clarity of message	Clear (20)	Somewhat clear -	Not clear -
Audio clarity	Clear (19)	Somewhat clear 1)	Not clear -
Emphasis	Appropriate (18)	Somewhat appropriate (2)	Not appropriate -
Speed	Appropriate (20)	Somewhat appropriate -	Not appropriate -
Pause	Appropriate (19)	Somewhat appropriate (1)	Not appropriate -
Duration	Appropriate (17)	Somewhat appropriate (3)	Not appropriate -
Music	Suitable (19)	Somewhat suitable (1)	Not suitable -

3.7 Assessing the effectiveness of developed video modules:

To assess the effectiveness of developed video modules, it was administrated on rural women of two villages i.e. Rampur and Sidhwan Khurd of Ludhiana District. Further 50 rural women from each village were purposively selected, who were actively performing the major household activities, had access to an android or any other more advanced handset with internet availability and regular users of WhatsApp and Facebook.

The effectiveness of video modules was measured in terms of gain in knowledge. The knowledge test consisted of following major and sub-practices:

Sr. No.	Name of the practices	No. of sub-practices
1.	Practices related to safe and judicious use of chemicals during cooking practices	8
2.	Safe practices for use of pesticides at household level	12
3.	Safe cleaning practices	3
4.	Safe use of chemicals in storage practices	4
5.	Safe hygiene and grooming practices	3

3.8 Data collection

Data were collected into two phases:

3.8.1 Phase I: Before exposure of video modules, data regarding the pre-knowledge test were collected from the respondents with the help of interview schedule.

During the pre-knowledge test, WhatsApp numbers of the respondents were noted and one WhatsApp group of 50 respondents was created for each village. After pre-knowledge test, developed video modules were sent through WhatsApp group to the respondents.



Data collection from the respondents

3.8.2 Phase II: After the exposure of video modules, a gap of minimum fifteen days was observed to assess the post knowledge test of the respondents.

3.9 Gain in knowledge

Gain in knowledge was operationalized as quantum of information or message newly learnt by an individual respondent by viewing the developed video modules. In order to assess gain in knowledge, knowledge test covered the important aspects of developed videos regarding major and sub-practices on safe and judicious use of chemicals at household level i.e. cooking practices, use of pesticides, cleaning practices, storage practices and personal hygiene & grooming practices. In this test, each practice on safe and judicious use of chemicals at household level was taking the response from the respondents in the form of multiple choice questions. A score of one was given to right answer and zero for the wrong answers. The total score of each respondent on the pre and post knowledge test was calculated out of a maximum score of 30. Score range was fixed between 1-30. The level of knowledge was categorized into low, medium and high as follows:

Level of knowledge	Score range
Low	1-10
Medium	11-20
High	21-30

The gain in knowledge of each respondent was calculated by using following formula:

$$\text{Gain in knowledge} = \text{Post knowledge test scores} - \text{Pre knowledge test scores}$$

$$\text{3.9.1 Average mean score of major practice} = \frac{\text{Sum of the total scores of all sub-practices of each major practice}}{\text{Number of sub-practices}}$$

$$\text{3.9.2 Percentage increase in average mean score of major practice} = \frac{\text{Average mean score of major practice after video exposure} - \text{Average mean score of major practice before video exposure}}{\text{Average mean score of major practice before video exposure}} \times 100$$

3.10 Selection of variables

Based on the practical knowledge, experience, review of literature and discussion with the experts, six independent variables were included in the study.

3.11 Measurements of independent variables

The measurement of various independent variables has been discussed under this part.

3.11.1 Age

It refers to is chronological age in terms of number of years completed by the respondent at the time of data collection. The number of years was taken as respondent's score on the variable. The age of the respondents was divided into three categories viz. 22-33 years, 34-45 years and 45-57 years. Age was categorized by using the category interval method as discussed below:

Age Group (in years)
22-33
34-45
45-57

3.11.2 Educational level

Education referred to formal education, the respondent had achieved. The category was started from illiterate level. The respondents were categorized into eight educational levels and assigned scores as following:

Categories
Illiterate
Primary
Middle
Matriculation
Senior secondary
Diploma Holder
Graduate
Post graduate

3.11.3 Family type

It refers to the members of the respondent's family living in nuclear (husband, wife and their children) or joint family (husband, wife, their children and parents). It was categorized as below:

Categories
Nuclear
Joint

3.11.4 Occupation of the respondent

It refers to a work in which the rural women and her family involved for money earning.

Categories
Homemaker
Enterprise at household level
Government service

3.11.5 Annual income of the family

It refers to the total income of family members' income from their occupation and from other sources per annum. The annual income as reportedly by the respondents was further categorised into three categories using the category interval method as below:

Categories
Rs. 60,000 – Rs. 9, 40,000
Rs. 9, 40,001 – Rs. 18, 20,000
Rs. 18, 20,001 – Rs. 27, 00000

3.11.6 Operational land holding

Operational land holding was operationalized as the actual land under tillage by the family at the time of investigation. Respondents were categorized into 5 categories as follows:

Categories	Range
Marginal	< 2.5 acres
Small	>2.5 – 5 acres
Semi - medium	>5 – 10 acres
Medium	>10 – 25 acres
Large	> 25 acres up to 33 acres

3.12 Analysis of Data

Statistical Package for Social Sciences (SPSS) was used to analyze the tabulated data. The software yielded relevant information which was consistent with the objectives of the study. The obtained responses were coded with some numerical values and filled in M S Excel sheets. Then, these Excel sheets were used for data analysis. The statistical tools used for the analysis and interpretation of the data were frequency distribution, percentage, category interval method, mean, paired 't' test, Karl Pearson's coefficient of

correlation and chi square.

3.12.1 Frequency

Data related to profile characteristics of the respondents was subjected to and interpreted in terms of their frequencies and percentage.

3.12.2 Percentage

The percentage was calculated by using the following formula:

$$\text{Percentage} = \frac{\text{Frequency}}{\text{Total no. of respondents}} \times 100$$

3.12.3 Category interval method

The range method was used to classify the respondents into different categories and was calculated using the formula:

$$\text{Category interval} = \frac{\text{Maximum score} - \text{Minimum score}}{\text{No. of categories to be formed}}$$

3.12.4 Mean

Mean score was worked out to highlight the average tendency of the data. The mean scores of a series of data were calculated by using the following formula:

$$\text{Mean score } \bar{X} = \frac{\sum X}{N}$$

Where,

\bar{X} = Arithmetic mean

\sum = Sum of score for all respondents

N = Number of items

3.12.5 Karl Pearson's coefficient of correlation

The correlation coefficient denoted by 'r' is a measure of the strength of the linear relationship between two variables. It takes on value ranging from -1 to +1. It was used to find out the correlation of respondent's personal and socio-economic characteristics with their gain in knowledge regarding safe and judicious use of chemicals at household level. Karl Pearson's coefficient of correlation was worked out as under:

$$r = \frac{\sum(X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum(X - \bar{X})^2} \sqrt{\sum(Y - \bar{Y})^2}}$$

Where,

X, Y = variables

\bar{X} = Mean of X variable

\bar{Y} = Mean of Y variable

3.12.6 Chi-square

For determining the association between independent variables (education, occupation and family type) of discrete series with gain in knowledge, the Chi-square test was used. For all other independent variables of continuous data, the relationship with gain in knowledge was determined through Karl Pearson coefficient of correlation.

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where,

χ^2 = chi-squared

O_i = observed value

E_i = expected value

3.12.7 Paired 't' test

To determine the significance of difference of mean values of scores which was attained at pre-exposure stage and post-exposure stage in each of the developed video modules, paired t- test was used. The formula used for calculating the value of paired 't' was as followed:

$$t = \frac{d}{SE_d} = \frac{(X - Y)}{SE_d}$$

Where,

d = X - Y

X = pre-exposure scores mean

Y = Post exposure scores mean

$$SE_d = \frac{s_d}{\sqrt{n-1}}$$

Where,

di = difference

n = sample size

The significant of computed 't' value was tested by referring to the Fisher and Yates.

3.13 Operational Definition

3.13.1 Video modules: It referred to a package of messages having text, text with pictures, and video clips related to different practices for safe and judicious use of chemicals.

3.13.2 Safe and judicious use of chemicals: It referred to practices related to the safe and wise use of chemicals for performing different household activities related to cooking, use of pesticides, cleaning, storage, hygiene, personal grooming & maintenance.

CHAPTER – IV

RESULTS AND DISCUSSION

This chapter deals with the results obtained from the study for creating awareness on safe and judicious use of chemicals at household level. These respondents were enquired about awareness regarding use of chemicals during performance of different activities at household level. The results of the study have been discussed under the following major and sub-headings:

- 4.1 Personal and socio-economic profile of respondents
- 4.2 Practices related to safe and judicious use of chemicals at household level
 - 4.2.1 Practices related to safe and judicious use of chemicals during cooking practices
 - 4.2.2 Safe practices for use of pesticides
 - 4.2.3 Safe cleaning practices
 - 4.2.4 Safe use of chemicals during storage practices
 - 4.2.5 Safe hygiene and grooming practices
- 4.3 Gain in knowledge after the video exposure
- 4.4 Relationship of personal and socio-economic characteristics of the respondents with gain in knowledge regarding safe and judicious use of chemicals at household level

4.1 Personal and socio-economic profile of the respondents

The distribution of rural women according to socio personal profile has been presented in Table 4.1 the details of each of these characteristics have been described as under:

4.1.1 Age

The data in the Table 4.1 indicated that the age of the respondents varied from 22-56 years. Most of the respondents (45%) belonged to the age group of 34-45 years, 28 per cent belonged to the age group of 22-33 and the remaining 27 per cent were in the age group of 46-57.

4.1.2 Education

The educational qualification of respondents varied from illiterate to post graduate. The figure given in the Table 4.1 reveals that 28 per cent of respondents had primary education and 17 per cent were diploma holder while 15 per cent of respondents were illiterate. Thirteen per cent had middle level education followed by nine per cent Matric. Seven per cent of respondents had education up to higher secondary level followed by six per cent graduates and the remaining five per cent were post graduate.

Table 4.1 Distribution of respondents according to their personal and socio-economic characteristics

(n=100)

Attributes	f(%)
Age (years.)	
22 – 33	28
34 – 44	45
45 – 56	27
Educational level	
Illiterate	15
Primary	28
Middle	13
Matric	9
Higher secondary	7
Diploma holder	17
Graduation	6
Post graduation	5
Occupation of respondents	
Homemaker	80
Enterprise at household level	8
Government Service	12
Family type	
Nuclear	51
Joint	49
Income	
Rs. 60,000 – Rs. 9,40,000	56
Rs. 9,40,001 – Rs. 18,20,000	40
Rs. 18,20,001 – Rs. 27,00000	4
Land holding	
Marginal (< 2.5 acres)	13
Small (>2.5 – 5 acres)	13
Semi - medium (>5 – 10 acres)	26
Medium (>10 – 25 acres)	38
Large (>25 acres up to 33 acres)	10

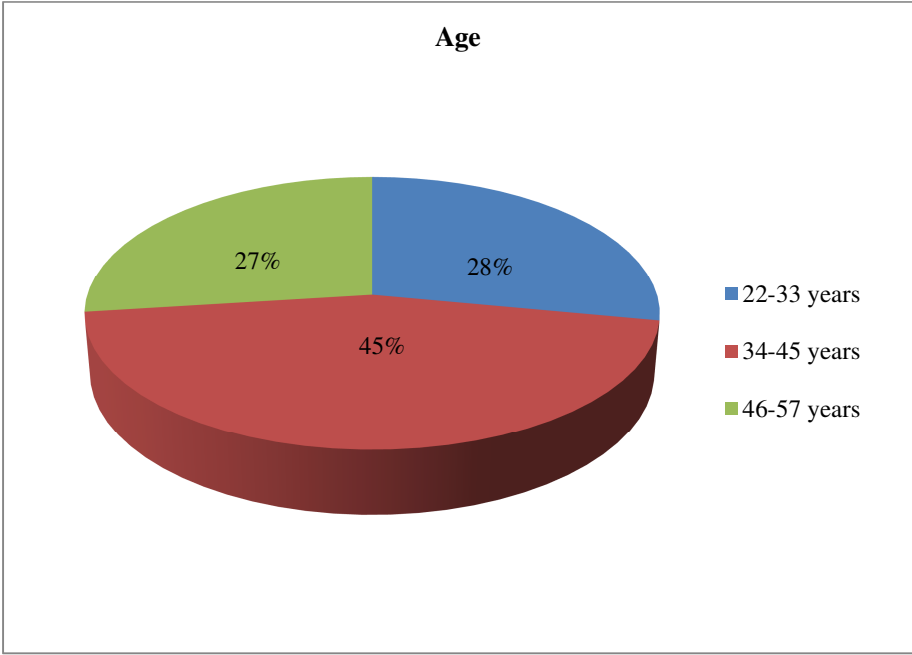


Fig 4.1 Graphical representation of the respondents on the basis of their age

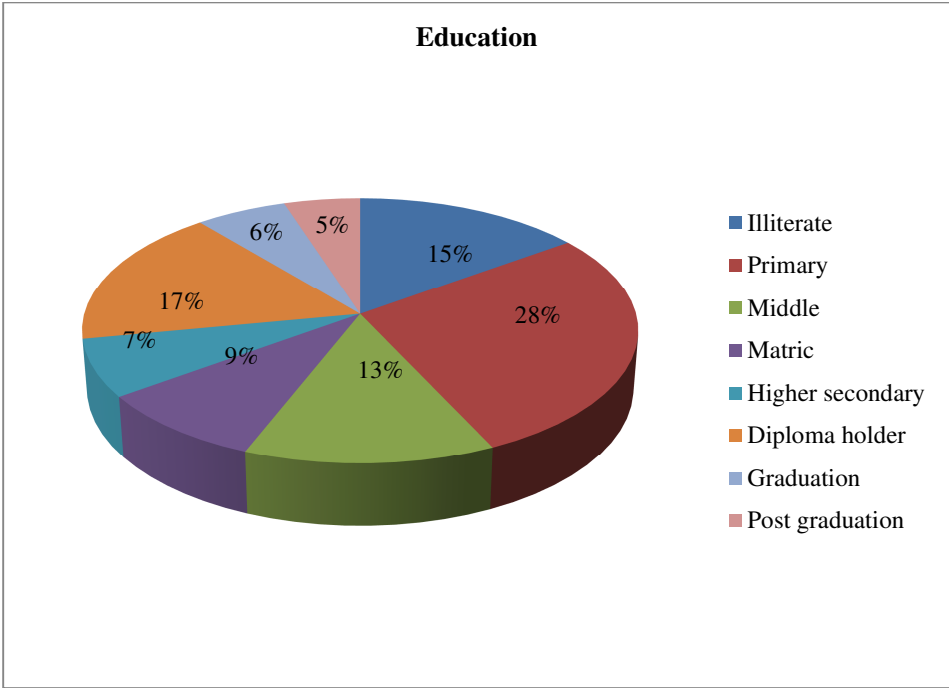


Fig 4.2 Graphical representation of the respondents on the basis of their education

4.1.3 Occupation of respondents

The figures given in Table 4.1 reveals that majority of respondents (80%) were homemakers. Twelve per cent of them were engaged in government service while eight per cent had their own enterprise at household level.

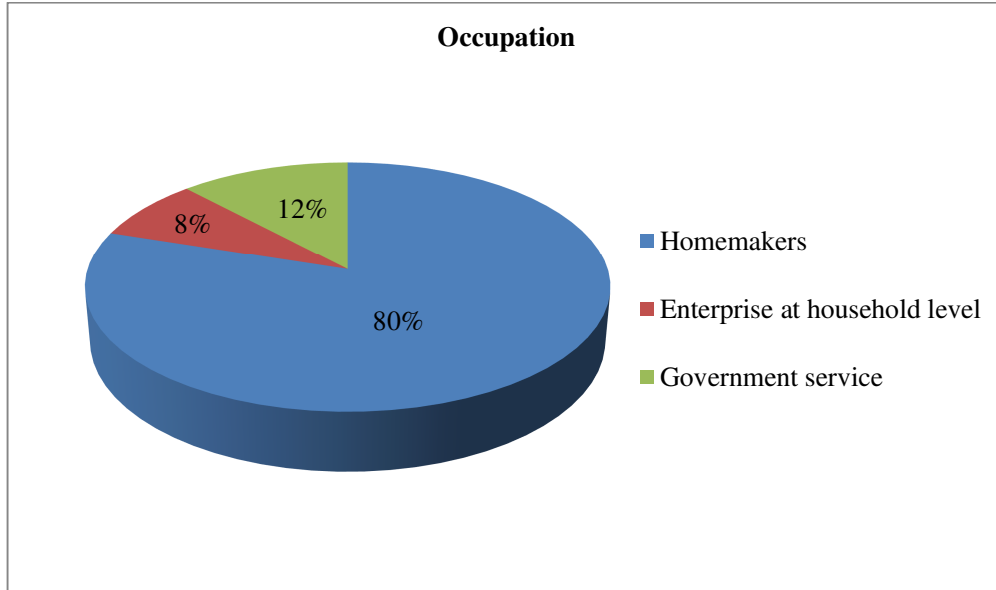


Fig 4.3 Graphical representation of the respondents on the basis of their occupation

4.1.4 Family type

The study of type of family of the respondents revealed that 51 per cent of the respondents were from nuclear families while 49 per cent belonged to joint families.

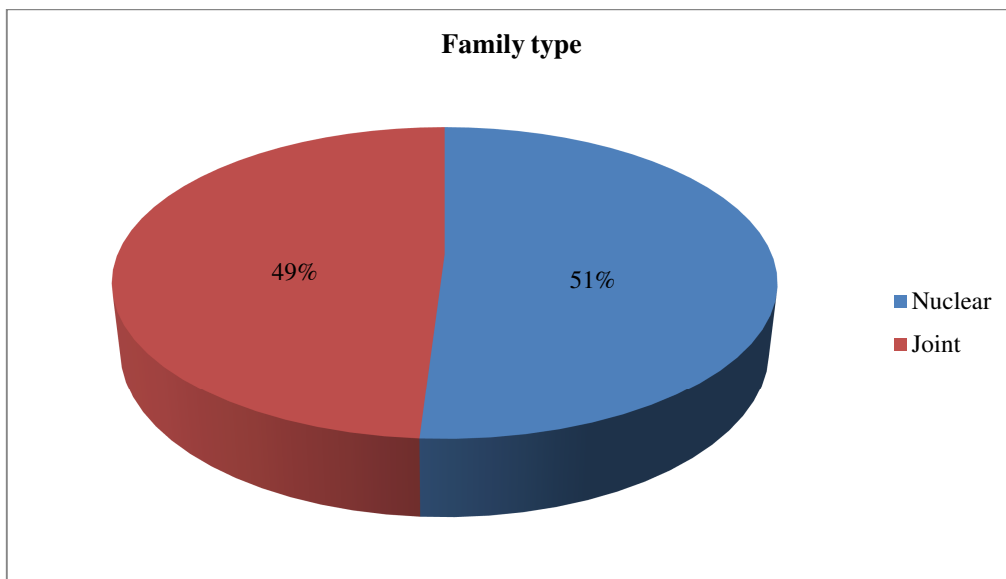


Fig 4.4 Graphical representation of the respondents on the basis of their family type

4.1.5 Annual Family income

As far as annual family income was concerned the data in Table 4.1 reveals that 56

per cent of respondents had family income between Rs. 60,000 – Rs. 9,40,000 per year, 40 per cent of respondents had family income between Rs. 9,40,001 – Rs. 18,20,000 and the remaining four per cent of them had an income between Rs. 18,20,001 – Rs. 27,00000.

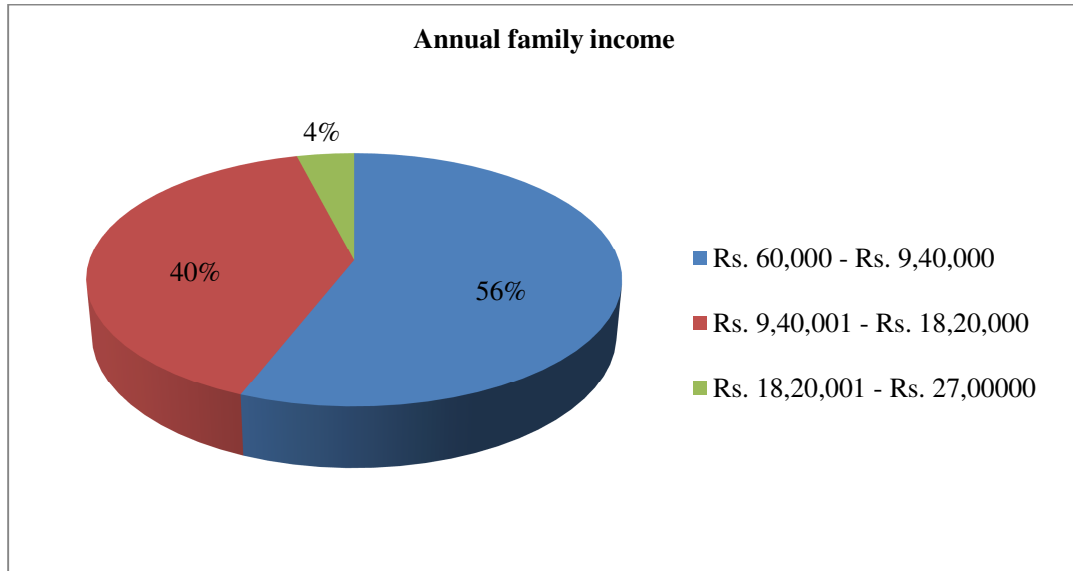


Fig 4.5 Graphical representation of the respondents on the basis of their income

4.1.6 Land holding

The data in the Table 4.1 indicated that the 38 per cent of respondents had medium (>10 – 25 acres) land holding and 26 per cent were semi-medium (>5 – 10 acres) land holders. Thirteen per cent had small (>2.5 – 5 acres) land holding followed by thirteen per cent of respondents who had marginal (< 2.5 acres) land holding. Remaining 10 per cent had large (> 25 acres upto 33 acres) land holding.

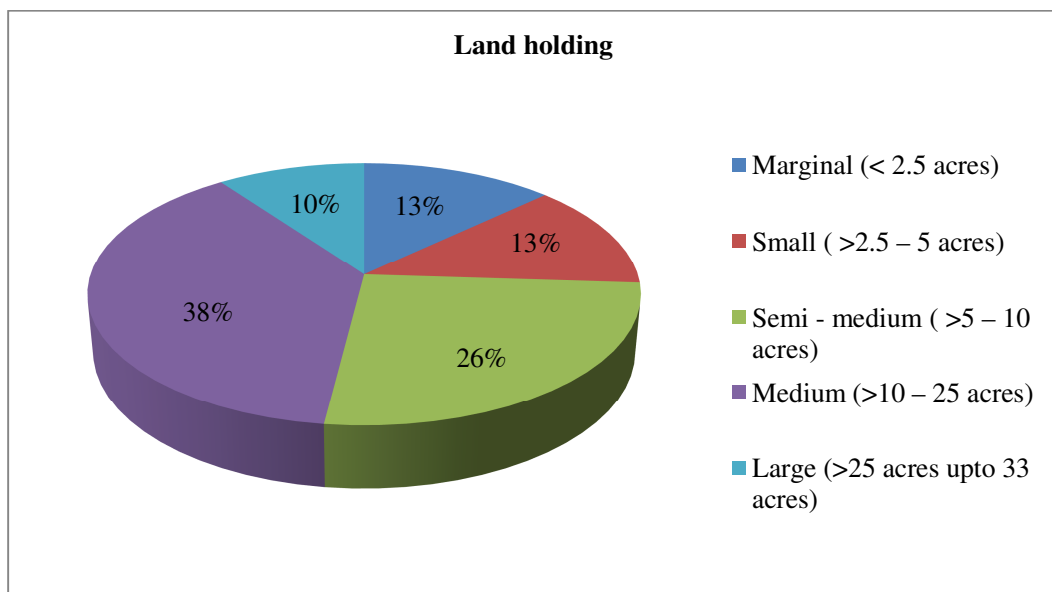


Fig 4.6 Graphical representation of the respondents on the basis of their land holding

4.2 Safe and judicious use of chemicals at household level

Chemical substances play crucial role in food production and its preservation. Artificial preservatives prolong the shelf life of foods. Food packaging materials and containers such as bottles, food handling & transport, can contain these synthetic substances such as plastic, elements of which can move into food. In the modern era, the agricultural production has expanded the chemical load on natural ecosystems. To get the maximum benefits from the agriculture produce, pesticides are used in fields. Sanitation plays an important role in our day to day life. It keeps the surroundings clean and soil free which helps to reduce the spreading of germs and helps to extend the life of our belongings. To eliminate the clothes moths, mostly mothballs are used. Consumers are becoming very conscious regarding the use of skin care products. Now, they have started reading the instructions given on the packaging of products than ever before. It is important to follow and maintain chemical safety. So this study aimed to identify different household practices related to safe and judicious use of chemicals at household level.

4.2.1. Safe and judicious use of chemicals during cooking practices

Presence of chemicals or synthetic material in food determined the protection of our food. Some synthetic substances may be used for storage of foods. These substances included preservatives and colouring agents. When these substances are added than the desired one, they could cause serious health problems i.e. skin reactions, toxic effects. The examples of toxic effects include gastrointestinal symptoms, kidney damage, and liver disease, impairment of the nervous system, or DNA damage, which could cause cancer. So, in this context cooking practices of farm women were studied and the Table 4.2 highlights that after video exposure, highest gain in knowledge i.e. 53 per cent was recorded for use of natural colours in foods because before video exposure only 30 per cent of the respondents had knowledge about it whereas 43 per cent gain was seen for avoiding the use of ajinomoto in food. Boiling of milk by simmering method had 23 per cent knowledge gain. Reason for low gain in knowledge may be because of common practice in homes. Lowest gain in knowledge (22%) was observed for recommended method of reuse of frying oil more than once.

4.2.2. Safe practices for use of pesticides at household level

Some researches showed that residues affects in vegetables and fruits cannot be completely removed by washing and peeling method. So, in this regard safe use of

Table 4.2 Knowledge of the respondents regarding cooking practices before and after the exposure of video modules

(n = 100)

Practices related to safe and judicious use of chemicals during cooking practices	Knowledge score before video exposure % age	Knowledge score after video exposure % age	Percent gain in knowledge
Avoid using the canned foods because it has fewer nutrients as compared to fresh foods.	48.00	78.00	30.00
Cooking in clay made utensils is the best for chemical free food.	53.00	7.009	26.00
Use natural colours in food because artificial colours cause cancer.	30.00	83.00	53.00
Avoiding the use of ajinomoto in food.	29.00	72.00	43.00
Use safe coagulant like Lemon juice/Citric acid for <i>paneer</i> making because it is safe.	61.00	90.00	29.00
Store deep frying oil in airtight container immediately after cooling and use it once for refrying.	35.00	69.00	34.00
Avoid reuse of frying oil for deep frying for more than once.	43.00	65.00	22.00
Boil milk by simmering method. It kills bacteria.	45.00	68.00	23.00

Practices related to safe and judicious use of chemicals during cooking practices

DO'S



Use fresh fruits and vegetable



Prepare food in clay made utensils



Use natural colors in food



Use lemon juice for paneer making.

DON'TS



Avoid using canned foods



Avoid using non-stick cook ware



Don't use artificial colours for food preparation



Avoid using hydrochloric acid for paneer making

pesticides was studied under different sub-practices. Data in the Table 4.3 depicted that highest percentage gain in knowledge score was noted for burying of empty containers practice i.e. 63 per cent and followed by 55 per cent in cleaning of clogged nozzle of spray pump. Fifty-three per cent knowledge was gained for thorough washing of clothes to

Table 4.3 Knowledge of the respondents regarding use of pesticides practices before and after the exposure of video modules

(n = 100)

Safe practices for use of pesticides at household level	Knowledge score before video exposure % age	Knowledge score after video exposure % age	Per cent gain in knowledge
Use recommended dose of pesticides / chemicals for spraying.	46.00	78.00	32.00
Use wooden stick and wear gloves for mixing of pesticides/chemicals.	29.00	76.00	47.00
Use fine quality plastic containers for mixing of pesticides.	33.00	80.00	47.00
Purchase pesticides from reliable sources.	47.00	77.00	30.00
Spray pesticides in morning and evening hours.	32.00	69.00	37.00
Clean clogged nozzle of spray pump with hot soapy water.	31.00	86.00	55.00
Follow wind direction while spraying pesticides.	47.00	68.00	21.00
Follow recommended waiting period to consume food commodities after spraying pesticides/chemicals.	39.00	61.00	22.00
Wash the clothes thoroughly to minimize the residue effect on clothes.	34.00	87.00	53.00
Soak the vegetables and fruits in solution of baking soda/baking powder for 15 minutes to minimize the pesticide and chemical residue effects in vegetables and fruits.	30.00	60.00	30.00
Keep the leftover pesticides in original containers.	42.00	65.00	23.00
Bury the empty containers of pesticides.	25.00	88.00	63.00

Safe practices for use of pesticides at household level

DO'S

DON'TS



Use wooden stick by wearing gloves for bare hands.



Avoid mixing of pesticides with mixing of chemicals.



Clean clogged nozzle of spray pump with with mouth.



Don't clean it by blowing air hot soapy water.



Bury the empty containers of pesticides.



Don't sell containers to the hawkers.

minimize the residue effect on clothes. Whereas using wooden stick for mixing of pesticides and use of fine quality plastic for mixing of pesticides had same gain in knowledge i.e. 47 per cent. Equal gain in knowledge i.e. 30 per cent was also observed in purchasing of pesticides from reliable sources and soaking of vegetables and fruits in solution of baking soda or powder to minimize the residue effect where as keeping pesticides in original containers and recommended waiting period to consume vegetables/fruits after spraying had gained knowledge score 23 and 22 per cent respectively. The right wind direction while spraying had lowest per cent gain in knowledge i.e. 21 because most of the families were from agriculture background and they may already knew the right wind direction of spraying.

4.2.3. Safe cleaning practices

Chemicals which are used for cleaning the house have substances that are dangerous for health. According to research studies, cleaning agents which are based on chemicals, affects the skin and respiratory tract. For safe and judicious use of chemicals in cleaning practices, the practices were studied and Table 4.4 depicted that for spraying of pesticides in kitchen at night time had high per cent gain i.e. 55, because at night time, no activity is performed in the kitchen and it is followed by 46 per cent for painting of walls with brush. Among all cleaning practices, the lowest gain in knowledge score (39 per cent) was in use of organic toilet cleaners. The reason may be that rural women had already awareness regarding the cleaning of toilet with organic cleaners.

Table 4.4 Knowledge of the respondents regarding cleaning practices before and after the exposure of video modules

(n = 100)

Safe cleaning practices	Knowledge score before video exposure % age	Knowledge score after video exposure % age	Per cent gain in knowledge
Spray the insecticides/chemicals at night time in the kitchen.	28.00	83.00	55.00
Paint the walls with brush.	31.00	77.00	46.00
Use organic toilet cleaners.	49.00	88.00	39.00

4.2.4. Safe use of chemicals in storage practices

Naphthalene balls are frequently used for storing the clothes at household level. These balls have strong chemicals, which affects the human lung tissues. If clothes treated with naphthalene balls, come direct contact with skin, it may cause irritation to the skin. Moreover, storage of clothes with naphthalene balls is expensive and time-consuming method. To solve this problem, store the clothes with newspaper, dried mint and *neem* leaves.

Safe cleaning practices at household level

DO'S



Paint the walls with brush.

DON'TS



Avoid spray painting.



**Spray the insecticides/chemicals at night
time in the kitchen**



**Don't spray chemicals at day time in
the kitchen**

Table 4.5, the data showed that highest i.e. 62 per cent of the respondents gained knowledge score regarding storage of food in glass jars practice because after the video exposure, they had gained knowledge score regarding adverse effects of storage of food in plastic containers and followed by 48 per cent in storage of pesticides under lock. It was observed that 45 per cent of the respondents gained knowledge regarding wrapping of food in cotton cloth whereas 38 per cent for storage of clothes with organic materials. The lowest gain for storage of clothes with organic material may be women were already use organic material for storage of clothes.

Table 4.5 Knowledge of the respondents regarding storage practices before and after exposure of video modules

(n = 100)

Safe use of chemicals in storage practices	Knowledge score before video exposure % age	Knowledge score after video exposure % age	Per cent gain in knowledge
Store the clothes with newspaper, dried mint and <i>neem</i> leaves.	39.00	77.00	38.00
Store food in glass jars.	27.00	89.00	62.00
Wrap the food in cotton cloth.	37.00	82.00	45.00
Store the pesticides under lock at safe place.	33.00	81.00	48.00

Safe use of chemicals in storage practices

DO'S



Store the clothes with dried mint and neem leaves

DON'TS



Avoid naphthalene balls for storage of clothes



Store food in glass containers



Don't use plastic for storage of foods

4.2.5. Safe hygiene and grooming practices

Women are the largest consumer group of cosmetics and personal care products. They use an average of 15 different such products every day. These contains up to 100 chemicals. Many of them are toxic or potentially toxic. According to WHO and the Endocrine Society, EDCs (endocrine disrupting chemicals) in cosmetic products increase the likelihood of serious and even potentially fatal diseases and health disorders. So, in this context, safe hygiene and grooming practices were studied and Table 4.5 highlights that 45 per cent gain in knowledge score was noted in use of organic material to dye hair practice followed by 44 per cent in use of hair spray. Use of bathing soap practice secured lowest gain in knowledge i.e. 39 per cent.

Table 4.6 Knowledge of the respondents regarding hygiene & grooming practices before and after exposure of video modules

(n = 100)

Safe hygiene and grooming practices	Knowledge score before video exposure % age	Knowledge score after video exposure % age	Per cent gain in knowledge
Avoid the frequent use of hair spray.	34.00	78.00	44.00
Use the organic material like <i>mehandi</i> , freshly brewed tea and coffee to dye hair.	43.00	88.00	45.00
Use the bathing soaps instead of shaving gels.	44.00	83.00	39.00

Safe use of chemicals in hygiene and grooming

DO'S

DON'TS



Use organic material to dye hair



Avoid the use of inorganic material to dye hair



Use bathing soaps for shaving



Don't use shaving gels for shaving

4.3 Gain in knowledge after the video exposure

After the exposure of video modules, gain in knowledge scores of the respondents are presented under two headings:

4.3.1 Level of knowledge of the respondents

4.3.2 Mean gain in knowledge score of all major practices

4.3.1 Level of knowledge of the respondents

To assess gain in knowledge, knowledge test covering the important aspects of developed videos regarding major and sub-practices on safe and judicious use of chemicals at household level i.e. cooking practices, use of pesticides, cleaning practices, storage practices and personal hygiene & grooming practices. In this test, each practice on safe and judicious use of chemicals at household level was taking the response from the respondents in the form of multiple choice questions. A score of one was given to right answer and zero for the wrong answers. The total score of each respondent on the pre and post knowledge test was calculated out of a maximum score of 30. Score range was fixed between 1-30.

The data regarding level of knowledge were presented in Table 4.7. The data revealed that 58 per cent of the respondents had medium knowledge level and 40 per cent had low knowledge level. Only two per cent had high level of knowledge. However, after video exposure 77 per cent of the respondents were found to have high level of knowledge, followed by medium (21%) and only two per cent of the respondents had low knowledge level after video exposure. Further from the findings, it can be inferred that the developed video modules on safe and judicious use of chemicals at household level acted as intervening variable by enhancing 75 per cent respondents in high knowledge level category. So, it could be concluded that there is a large difference between pre and post knowledge level of the respondents.

Table 4.7 Overall knowledge level of respondents regarding safe and judicious use of chemicals at household level before and after the exposure of video modules

(n = 100)

Level of knowledge Score range (1 – 30)	Before video exposure (%)	After video exposure (%)
Low (1 – 10)	40.00	2.00
Medium (11 – 20)	58.00	21.00
High (21 – 30)	2.00	77.00

4.3.2 Mean gain in knowledge score of all major practices

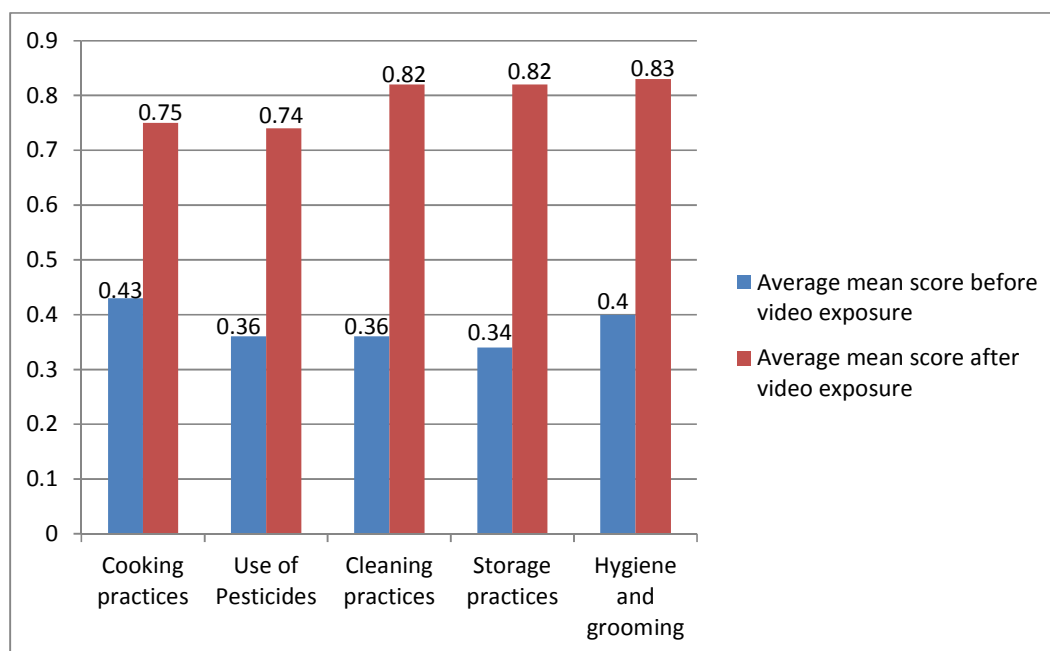
All major practices on safe and judicious use of chemicals at household level were compared. Highest percentage increase in average mean score was observed for safe storage practices (48 per cent) followed by 46 per cent in cleaning practices. Lowest percentage change in mean score was seen in cooking practices. Reason for lowest changes in mean score for this major cooking practice may be that women are frequently involved in this activity might be knowing all sub-practices of cooking as compared to other major practices. The significant change was observed for all major practices related to safe and judicious use of chemicals at household level. Overall significant change for all five major practices was 41.1 per cent. So, prepared video modules are proved to be effective for creating awareness among people regarding safe and judicious use of chemicals at household level.

Table 4.8 Mean gain in knowledge scores of the respondents before and after the exposure of video modules

(n = 100)

Name of the major practices	(Average mean score) Before video exposure	(Average mean score) After video exposure	Percentage increase in average mean score	t-test
Cooking practices (Total no. of practices: 8)	0.43	0.75	32	15.516**
Use of pesticides (Total no. of practices: 12)	0.36	0.74	38	18.940**
Cleaning practices (Total no. of practices: 3)	0.36	0.82	46	15.198**
Storage practices (Total no. of practices: 4)	0.34	0.82	48	16.940**
Personal hygiene and grooming (Total no. of practices: 3)	0.40	0.83	43	11.920**
All household practices (Total no. of practices: 30)	0.37	0.79	41.4	32.91**

****Significant at 1% level of significance**



4.4 Relationship of personal and socio-economic characteristics of the respondents with gain in knowledge regarding safe and judicious use of chemicals at household level

The data presented in Table 4.9 measured the relationship of the personal and socio-economic profile with gain in knowledge and it was found that age, annual family income and land holding of the respondents had non-significant relationship with gain in knowledge. But annual family income and land holding of the respondents were negatively related with gain in knowledge whereas positive and non-significant relationship was observed between age of the respondents and gain in knowledge. It may be concluded that respondents with low income and land holding had shown interest to learn about these practices on safe and judicious use of chemicals at household level.

Table 4.9 Relationship of personal and socio-economic characteristics of the respondents with gain in knowledge

Variables	'r' value (gain in knowledge)
Age	0.009 ^{NS}
Annual family income	-0.073 ^{NS}
Land holding	-0.077 ^{NS}

4.4. Association of personal and socio-economic characteristics of the respondents with gain in knowledge regarding safe and judicious use of chemicals at household level

The data with respect to education, occupation and family type of the respondents were discrete in nature and thus were subjected to chi-square test for the purpose of knowing their association with gain in knowledge. Table 4.10 indicated that education, occupation and family type had non-significant association with gain in knowledge.

Table 4.10 Association of personal and socio-economic characteristics of the respondents with gain in knowledge

n = 100

Variables	Gain in knowledge				
	Low	Medium	High	Total	' χ ' value
Education					
Illiterate	-	5	10	15	13.371 ^{NS}
Primary	-	7	21	28	
Middle	1	-	12	13	
Matric	-	2	7	9	
Higher secondary	1	1	5	7	
Diploma holder	-	4	14	18	
Graduation	-	1	4	5	
Post graduation	-	1	4	5	
Occupation					
Housewife	1	20	59	80	3.602 ^{NS}
Enterprise at household level	-	1	7	8	
Govt. service	1	-	11	12	
Family type					
Nuclear	1	10	40	51	0.949 ^{NS}
Joint	1	12	36	49	

CHAPTER – V

SUMMARY AND CONCLUSION

Chemicals have become an integral part of our daily life. Many household chemicals are being used in performing different activities. Pesticides have contributed significantly in improving food security through increased food production and reducing post harvest losses. High amount of residues of chemicals in different household activities causes concern regarding health related risk factors to human beings. This health related risk factors could be avoided to a certain extent by creating awareness on safe and judicious use of chemicals. In this direction, the video modules can help to reduce the health hazards caused by use of chemicals. The present investigation entitled, **“Development of video modules for creating awareness on safe and judicious use of chemicals at household level”** has been therefore, undertaken with the following objectives:

1. To identify practices for safe and judicious use of chemicals at the household level.
2. To develop video modules on identified practices.
3. To assess the effectiveness of developed video modules.

5.1. Material and Methods

The present study was development oriented and the major aim was to develop video modules for creating awareness on safe and judicious use of chemicals at household level. Therefore, in order to achieve this aim, a search on literature was made to identify the practices for safe and judicious use of chemicals. For this, past research studies, booklets, articles in different newspapers & magazines and books on pesticides were consulted with reference to residual effects of pesticides on health and health hazards caused due to these chemicals. Relevant information was available for developing interview schedule. With the help of major advisor and consultation of Subject Matter Specialist, 36 practices were finalized for knowledge test. The tool for data collection was prepared by consulting the relevant literature and experts in the field. The research instrument was divided into three parts. The first part was dealt with personal profile and the second part consisted of socio-economic profile. The third part included the knowledge test regarding safe and judicious use of chemicals at household level. The test constituted multiple choice questions. All the items had a score of one for each correct response and zero for incorrect response. Items analysis including index and discrimination power index was worked out for the finalization of the knowledge test. Knowledge test was pre-tested on sample of 20 farm women from non sampled area i.e. village Kandiala, district Tarn-Taran. The item difficulty index and discriminating power of the knowledge test was calculated. Out of 36, only 30 items got selected for knowledge test. After finalizing the practices and the development of interview schedule, the development of script is an essential requirement for developing video modules.

Before developing script, all identified practices were translated into Punjabi. The script was basically designed to lead the pathway in logical manner. Therefore, the script consisted of outlining the structures and content by arranging text and pictures. Then, it was also shown to the Experts to get their approval. Audio files and video modules were prepared. Photographs were taken according to the script. Digital camera and mobile phone were used to capture the photographs. Then, the photographs were arranged in a sequence according to the script. The audio files were prepared and then synchronized with text and photographs at appropriate places. Background music was also inserted in the video. After completing the production of videos, these were evaluated to determine how well it can serve its purpose as per its characteristics/attributes. Three point rating scale was developed to measure the appropriateness of video modules. Then, it was given to a group of 20 judges from the departments of Extension Education, Extension Education and Communication Management and Communication centre. Suggestions given by judges were incorporated and video modules were finalized. To assess the effectiveness of developed video modules, it was administrated on rural women of two villages i.e. Rampur and Sidhwan Khurd of Ludhiana District. Further 50 rural women from each village were purposively selected, who were actively performing the major household activities, had access to an android or any other more advanced handset with internet availability and regular users of WhatsApp and Facebook. The effectiveness of video modules was measured in terms of gain in knowledge. The knowledge test consisted of major and sub-practices related to safe and judicious use of chemicals at household level. Data were collected into two phases. Before exposure of video modules, data regarding the pre-knowledge test were collected from the respondents with the help of interview schedule. During the pre-knowledge test, WhatsApp numbers of the respondents were noted and one WhatsApp group of 50 respondents was created for each village. After pre-knowledge test, developed video modules were sent through WhatsApp group to the respondents. After the exposure of video modules, a gap of minimum fifteen days was observed to assess the post knowledge test of the respondents.

In order to assess gain in knowledge, knowledge test covering the important aspects of developed videos regarding major and sub-practices on safe and judicious use of chemicals at household level i.e. cooking practices, use of pesticides, cleaning practices, storage practices and personal hygiene & grooming practices. In this test, each practice on safe and judicious use of chemicals at household level was taking the response from the respondents in the form of multiple choice questions. A score of one was given to right answer and zero for the wrong answers. The total score of each respondent on the pre and post knowledge test was calculated out of a maximum score of 30. Score range was fixed between 1-30. The level of knowledge was categorized into low, medium and high. Mean gain in knowledge score of all major practices were

calculated as well as compared. The statistical tools used for the analysis and interpretation of the data were mean, frequency, percentage, paired 't' test, correlation and chi-square.

5.2. Major Findings

The salient findings of study are summarized below under following headings:

5.2.1. Personal and Socio-economic Profile

The findings revealed that 45 per cent of the respondents belonged to the age group of 34-45 years, 28 per cent belonged to the young age group of 22-33 and the remaining 27 per cent were in the old age group of 46-57. About 28 per cent of respondents had primary education and 17 per cent were diploma holder while 15 per cent of respondents were illiterate. Thirteen per cent had middle education followed by nine per cent of Matric. Seven per cent of respondents had education up to higher secondary level followed by six per cent of graduation and the remaining five per cent were post graduate. Majority 80 per cent of farm women were housewives followed by 12 per cent were engaged in government service while eight per cent had their enterprise at household level. About 51 per cent of respondent were from nuclear families where as 49 belonged to joint families. About 56 per cent of respondents had family income between Rs. 60,000 – Rs. 9, 40,000 per year, 40 per cent of respondents had family income between Rs. 9, 40,001 – Rs. 18, 20,000 and the remaining 4 per cent of them had an income between Rs. 18, 20,001 – Rs. 27, 00000. About 38 per cent of respondents had medium (>10 – 25 acres) land holding and 26 per cent were semi-medium (>5 – 10 acres) land holders. Thirteen per cent had small (>2.5 – 5 acres) land holding followed by 13 per cent of marginal (< 2.5 acres) land holding. Remaining 10 per cent had large (> 25 acres up to 33 acres) land holding.

5.2.2. Major Household Practices

5.2.2.1. Safe and judicious use of chemicals during cooking practices

After video exposure, highest gain in knowledge i.e. 53 per cent was recorded for use of natural colours in foods because before video exposure only 30 per cent of the respondents had knowledge about it whereas 43 per cent gain was seen for avoiding the use of ajinomoto in food. Boiling of milk by simmering method had 23 per cent knowledge gain. Reason for low gain in knowledge may be because of common practice in homes. Lowest gain in knowledge (22 per cent) was observed for recommended method of reuse of frying oil more than once.

5.2.2.2. Safe practices for use of Pesticides at household level

Highest percentage gain in knowledge score was noted for burying of empty containers practice i.e. 63 per cent and followed by 55 per cent in cleaning of clogged nozzle of spray pump. Fifty-three per cent knowledge was gained for thorough washing of clothes to minimize the residue effect on clothes. Whereas using wooden stick for mixing of pesticides

and use of fine quality plastic for mixing of pesticides had same gain in knowledge i.e. 47 per cent. Equal gain in knowledge i.e. 30 per cent was also observed in purchasing of pesticides from reliable sources and soaking of vegetables and fruits in solution of baking soda or powder to minimize the residue effect where as keeping pesticides in original containers and recommended waiting period to consume vegetables/fruits after spraying had gained knowledge score 23 and 22 per cent respectively. The right wind direction while spraying had lowest per cent gain in knowledge i.e. 21 because most of the families were from agriculture background and they may already knew the right wind direction of spraying.

5.2.2.3. Safe cleaning Practices

For spraying of pesticides in kitchen at night time had high per cent gain i.e. 55, because at night time, no activity is performed in the kitchen and it is followed by 46 per cent for painting of walls with brush. Among all cleaning practices, the lowest gain in knowledge score (39 per cent) was in use of organic toilet cleaners.

5.2.2.4. Safe use of chemicals in storage Practices

Highest i.e. 62 per cent of the respondents gained knowledge score regarding storage of food in glass jars practice because after the video exposure, they had gained knowledge score regarding adverse effects of storage of food in plastic containers and followed by 48 per cent in storage of pesticides under lock. It was observed that 45 per cent of the respondents gained knowledge regarding wrapping of food in cotton cloth whereas 38 per cent for storage of clothes with organic materials.

5.2.2.5. Safe hygiene and grooming

Forty-five per cent gain in knowledge score was noted in use of organic material to dye hair practice followed by 44 per cent in use of hair spray. Use of bathing soap practice secured lowest gain in knowledge i.e. 39 per cent.

5.2.2.6 Relationship and association between personal and socio-economic and gain in knowledge

Age, annual family income and land holding of the respondents had non-significant relationship with gain in knowledge. The data with respect to education, occupation and family type of the respondents were discrete in nature and thus were subjected to chi-square test for the purpose of knowing their association with gain in knowledge. Education, occupation and family type had non-significant association with gain in knowledge.

5.3. Conclusions and Suggestions

- Before the video exposure, respondents had lowest knowledge score regarding use of artificial food colours and avoid the use of ajinomoto during cooking of food and highest gain was observed in these practices. After the exposure of video modules, highest gain in knowledge score was seen for proper procedure of disposal of empty containers of pesticides and cleaning of clogged nozzles with soapy water not by blowing with mouth.

Before video exposure, lowest knowledge score was also observed in spraying of pesticides/insecticides in the kitchen at night time. The practice had also achieved highest gain in knowledge after the exposure of video modules.

So, there is a need to create the awareness among people regarding practices having lowest knowledge score before video exposure.

- The significant change was observed for all major practices related to safe and judicious use of chemicals at household level. Percentage of the respondents in high level of knowledge category was shifted from 2 to 77 per cent after video exposure.

So, prepared video modules are proved to be effective for creating awareness among people regarding safe and judicious use of chemicals at household level. Prepared video messages can be uploaded on official site of PAU. On the basis of content of video messages, a booklet can be developed in Punjabi on all the practices i.e. cooking practices, use of chemicals, cleaning practices, storage practices & hygiene and grooming practices. These video modules can be used by extension personnel for their wider outreach.

5.4. Suggestions for future research

- i. The similar study can be conducted in other districts of Punjab.
- ii. The study can be conducted by developing the video modules on safe and judicious use of insecticides and pesticides at the farm level.
- iii. Video on major issues like environment pollution, water saving technologies and social issues etc. can be developed for creating awareness among public.

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INTERVIEW SCHEDULE

Development of video modules for creating awareness on safe and judicious use of chemicals at household level

1. PERSONAL AND SOCIO-ECONOMIC PROFILE

Name of the respondent				
W/o or D/o				
Contact No.				
Age (years)				
Educational qualification	Illiterate	Primary	Middle	Matric
	Higher secondary	Diploma holder	Graduation	Post graduation
Occupation of the respondent	Homemaker	Enterprise at household level		Government Service
Type of family	Nuclear		Joint	
Annual income of family				
Size of land holding				

2. COOKING PRACTICES

Tick the appropriate answers from the following

- i. Canned foods are:
- a) More nutritious for human health ()
 - b) Less nutritious for human health ()
 - c) As nutritious as fresh foods ()
 - d) Don't know ()
- ii. Best cooking utensil for chemical free food is:
- a) Clay pots ()
 - b) Stainless steel ()
 - c) Non-stick cookware ()
 - d) Don't know ()

- iii. Complications caused due to artificial food colors:
 - a) Allergic reactions ()
 - b) Cancer ()
 - c) Hyperactivity in children ()
 - d) Don't know ()
- iv. Use of Ajinomoto causes:
 - a) Cancer ()
 - b) Chest pain ()
 - c) Constipation ()
 - d) No effect ()
- v. Select safe coagulants for paneer making:
 - a) Lemon juice/ Citric acid ()
 - b) Alum ()
 - c) Sulphuric acid ()
 - d) Don't know ()
- vi. Best reuse of frying oil is:
 - a) Deep frying the food within 6 hours ()
 - b) Curry preparations ()
 - c) Anytime ()
 - d) Don't know ()
- vii. Reuse of frying oil for frying cause:
 - a) Heart diseases ()
 - b) Diabetes ()
 - c) Skin irritation ()
 - d) Eye irritation ()
- viii. Best treatment to kill the bacteria from milk before consumption is:
 - a) Consume boiled milk ()
 - b) Use boiled milk ()
 - c) No treatment (Raw milk) ()
 - d) Pasteurized milk (boiling for few seconds) ()

3. USE OF PESTICIDES

I. Before spray

- i. Check the right dose of pesticides/chemicals for spraying:
 - a) From package of practices by P.A.U. ()

- b) From pesticide/chemical shops ()
- c) From internet ()
- d) Any others ()
- ii. Best method for mixing of pesticides/chemicals:
 - a) With wooden stick by wearing gloves on hands ()
 - b) Bare hands ()
 - c) Iron rod ()
 - d) Don't know ()
- iii. Best container for mixing of pesticides/chemicals:
 - a) Fine quality plastic ()
 - b) Metallic containers ()
 - c) Wooden ()
 - d) Others ()
- iv. Reliable source of purchasing of pesticides/chemicals:
 - a) Licensed holder dealer ()
 - b) Uncertified dealer ()
 - c) Retailer shop ()
 - d) Don't know ()
- v. Best time for spraying of pesticides/chemicals:
 - a) Morning and evening ()
 - b) At noon ()
 - c) At night ()
 - d) Any others ()

II. During spray

- i. In case of clogging nozzle, technique for cleaning of spray pump:
 - a) By blowing with mouth ()
 - b) Wash under hot water ()
 - c) Wash in warm water with soap ()
 - d) Don't know ()
- ii. Following direction of wind is right while spraying pesticides/chemicals:
 - a) Same direction ()
 - b) Opposite direction ()
 - c) Direction doesn't matter ()

d) Don't know ()

III. After spraying

- i. Time to consume food commodities after spraying pesticides/chemicals:
 - a) Immediately after spraying ()
 - b) After washing ()
 - c) After following waiting periods given by P.A.U. ()
 - d) Doesn't matter ()
- ii. Safe and best method to minimize the pesticide/chemical residues on clothes:
 - a) Through aeration ()
 - b) By washing ()
 - c) Neither washing nor aeration ()
 - d) Don't know ()
- iii. Best treatment to minimize pesticide/chemical residual effects in vegetables and fruits:
 - a) Wash under running tap water ()
 - b) Blanching ()
 - c) Soaking into Baking soda/Baking powder for 12 to 15 minutes ()
 - d) Don't know ()
- iv. Safest container to store left over pesticides/chemicals after use:
 - a) Original containers ()
 - b) Plastic containers ()
 - c) Glass containers ()
 - d) Metallic containers ()
- v. Best method to destroy empty containers of pesticides/chemicals after spraying:
 - a) By burning ()
 - b) By burying ()
 - c) Sell to the hawkers ()
 - d) Give children to play ()

4. CLEANING PRACTICES

- i. Safe time to spray insecticides/chemicals in the kitchen is:
 - a) During daytime ()
 - b) During night ()

- c) Anytime ()
- d) Don't know ()

- ii. From the following, the best method to paint walls:
 - a) Paint with brush ()
 - b) Paint with roller ()
 - c) Spray paint ()
 - d) Don't know ()

- iii. Harpic (toilet cleaner) causes the following complications:
 - a) Heart diseases ()
 - b) Skin and eye irritation ()
 - c) Cancer ()
 - d) Don't know ()

5. STORAGE PRACTICES

- i. Following is not safe method for storage of clothes:
 - a) Naphthalene balls ()
 - b) Dried mint ()
 - c) Dried neem leaves ()
 - d) Newspapers ()

- ii. Usage of plastic containers for food storage may cause:
 - a) Fertility and reproductive problems ()
 - b) Aneamia ()
 - c) Obesity ()
 - d) Cold and cough ()

- iii. Safest wrapping material for food is:
 - a) Newspaper ()
 - b) Aluminium foil ()
 - c) Food grade wrapping papers ()
 - d) Don't know ()

- iv. Safest place to store the pesticides/chemicals:
 - a) Kitchen ()
 - b) Cattle shed ()

- c) In the open field ()
- d) Locked chemical store ()

6. PERSONAL HYGIENE AND GROOMING

- i. Frequent use of hair spray may lead to:
 - a) Heart diseases ()
 - b) Allergies and sensitivities ()
 - c) Obesity ()
 - d) Don't know ()
- ii. Following is not safe method to dye hair:
 - a) Chemical based dyes ()
 - b) Vegetable based dyes ()
 - c) Freshly brewed coffee or tea ()
 - d) Don't know ()
- iii. High level exposure of shaving gels may cause:
 - a) Heart diseases ()
 - b) Dizziness ()
 - c) Cancer ()
 - d) Don't know ()

VITA

Name of the student : Jasbir Kaur
Father's name : S. Tarlok Singh
Mother's name : Smt. Pinderjit Kaur
Nationality : Indian
Date of Birth : May 15th, 1997
Permanent home address : Village Kandiala, Tehsil Patti,
District Tarn Taran, Punjab, 143415
E-mail : jaskalkaler9951@gmail.com

EDUCATIONAL QUALIFICATION

Bachelor's degree : B.Sc. Home Science
University and year of award : Punjab Agricultural University, Ludhiana
2019
OCPA : 7.14/10.00
Master's degree : M.Sc. Extension Education and
Communication Management
University and year of award : Punjab Agricultural University, Ludhiana
2022
OCPA : 7.91/10.00
Title of Master's Thesis : Development of video modules for creating
awareness on safe and judicious use of
chemicals at household level
Awards/Distinction/Fellowship : Recipient of University merit scholarship,
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