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Effectiveness of Personal versus Online Extension Methods in Disseminating Knowledge on Household Waste Management

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ABSTRACT

The article highlights the effectiveness of personal and online extension methods for disseminating knowledge on household waste management. A pre-test, post-test experimental design was used for the study. Thirty women, each from five randomly selected urban localities of Ludhiana district of Punjab were selected for the study, making a total of 150 respondents as the sample size. Of the five urban localities, four localities were randomly chosen for the experiment and one locality was chosen as the control group. Data was collected using a structured interview schedule consisting of a self-designed knowledge test on household waste management. Findings revealed that all the selected extension methods were effective in disseminating knowledge to the respondents. The most effective extension method was personal contact + print material followed by video conferencing + ICT based messages, video conferencing, and personal contact method. One-way ANOVA revealed significant differences in gain in knowledge by the respondents of the study groups' $p < 0.001$. Post-hoc analysis further revealed that the effect of both personal and online extension methods when supplemented with educational materials and when used solo, had statistically similar effects on gain in knowledge.

INTRODUCTION

Since years extension; the information and knowledge support system for people, has played a magnificent role in providing knowledge to the people and making them aware of betterment and realization of their settings. It plays a vital role in making people aware and convincing them to take action (Patel et al., 2019). The process of disseminating information requires a method to be put to use. Numerous extension methods like farm and home visits, demonstrations, study tours, field days, etc. till now have proved to be effective in disseminating knowledge and changing the behaviour of people on various issues (Olawale et al., 2013). But today, with the advancement in technology we have ample online extension methods like video conferencing, social networking applications, digital messages, etc. available for information dissemination (Barton et al., 2017; Capila & Sachdev, 2010). These methods contribute to a great extent not only in increasing knowledge of the people but also in meeting the developmental goals of communities (O'Donnell, 2009). History provides great evidence of extension methods being successfully used in disseminating an array of important information to the people (Mahra et al., 2017) and making them aware about certain drastic issues. From agriculture to health to hygiene, the use extension methods have proved to be effective in spreading awareness and providing people with necessary information (Kumari et al., 2019).

However, if we carefully gaze at the current and future issues affecting the planet, waste management is the most alarming, challenging, and threatening (Asteria & Haryanto, 2021). The world is increasingly generating chunks of trash the majority of which comes from the households (Kaza et al., 2018). The high rise in population, urbanization, and industrialization goes hand in hand with the rise in waste production (Hoornweg & Bhada-Tata, 2012). It is not only baleful to human health but also to the environment (Yoada et al., 2014). To deal with the waste produced at the

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household level effective waste management strategies should be employed, however the lack of knowledge and interest can be a major loop hole in the process of employing waste management strategies by individuals. So it is more important to disseminate knowledge and increase the interest of people towards waste management. Therefore, the study was conducted with an aim to compare the effectiveness of personal and online extension methods in disseminating knowledge on household waste management and to investigate the effect of socio-personal characteristics on gain in knowledge by the respondents.

METHODOLOGY

The study was conducted in randomly selected five urban localities of Ludhiana district of Punjab. For the study, experimental research design was used having four experimental groups and a control group. Thirty women in the age group of 20-55 years were randomly chosen from each of the selected urban localities. Thus, a total of 150 respondents were selected for the study. Respondents of each selected group were subjected to a pre knowledge test followed by an intervention given only to the experimental groups through selected extension methods. For the intervention, experimental group 1 (E1), experimental group 2 (E2), experimental group 3 (E3), and experimental group 4 (E4) were exposed to personal contact method, personal contact + print material, video conferencing, and video conferencing + ICT based messages respectively. The control group (C) received no intervention. The intervention was given one month after the pre knowledge test, followed by a post knowledge test administered two weeks after the intervention. The difference between the pre and post knowledge test scores highlighted the gain in knowledge by the respondents and per cent gain in knowledge was used to determine the effectiveness of extension methods for disseminating knowledge on household waste management.

$$\text{Effectiveness of extension method} = \left\{\left(\frac{\text{Post knowledge test scores EG} - \text{Pre knowledge test scores EG}}{\text{Pre knowledge test scores EG}}\right) - \left(\frac{\text{Post knowledge test scores CG} - \text{Pre knowledge test scores CG}}{\text{Pre knowledge test scores CG}}\right)\right\}$$

Where, EG = Experimental Group; CG = Control Group

The data was collected in two stages (before and after the intervention) using a structured interview schedule consisting of a self-designed knowledge test (reliability score = 0.80 and validity score= 0.89) on household waste management.

Different statistical tools including percentages and means, Z-test, One-way Analysis of Variance (ANOVA) and post-hoc analysis (Tukey's Test) were used to analyze the data. Data were analyzed using Statistical Package for the Social Sciences Version 28 (IBM Corp).

RESULTS AND DISCUSSION

Knowledge level of the respondents on household waste management before and after the intervention

Table 1 depicts the knowledge level of the respondents before and after the intervention. It can be observed that before the intervention, in experimental group 1, more than one-fourth (26.67%) of the respondents had a low knowledge level, more than two-fifth (43.33%) of the respondents had a medium knowledge level, and 30.00 per cent respondents had a high knowledge level. Whereas, after the intervention (Personal contact) almost all (96.67%) the respondents reached to a high knowledge level. A statistically significant difference at 5 per cent level of significance was observed in each category of knowledge before and after the intervention. It can be concluded that there was gain in knowledge of the respondents after the intervention.

In experimental group 2, before the intervention most (80.00%) of the respondents had a low knowledge level, few (13.33%) respondents had a medium knowledge level, and only two (6.67%) respondents had a high knowledge level whereas after the intervention (Personal contact + Print media) nearly one-fourth (23.33%) of the respondents moved to a medium knowledge level and majority (76.67%) of the respondents moved to high knowledge level. A statistically significant difference at 5 per cent level of significance was observed in each category of knowledge before and after the intervention. Therefore gain in knowledge of the respondents was reported after the intervention.

In experimental group 3, before the intervention more than two-fifth (43.33%) of the respondents had a low knowledge level, more than half (53.33%) of the respondents had a medium knowledge level, and only one (3.33%) of the respondents was in high knowledge level. Whereas, after the intervention (Video conferencing) one-fifth (20.00%) of the respondents had a medium knowledge level, and most (80.00%) of the respondents reached to high knowledge level. A statistically significant difference at 5 per cent level of significance was observed in each category of knowledge before and after the intervention. Hence, it can be said that there was gain in knowledge of the respondents after the intervention. In experimental group 4, before the intervention two-fifth (40.00%) of the respondents had low knowledge level, more than half (56.67%) of the respondents had a medium knowledge level and only one (3.33%) respondent had a high knowledge level. After the intervention (Video conferencing + ICT messages), only one (3.33%) respondent had a medium knowledge and almost all (96.67%) the respondents moved to high knowledge level. A statistically significant difference at 5 per cent level of significance was observed in each category of knowledge before and after the intervention. It can be concluded that there was gain in knowledge of the respondents after the intervention.

And lastly, in the control group, 46. 67 per cent of the respondents had a low knowledge level, more than two-fifth (43.33%) of the respondents had a medium knowledge level, and very few (10.00%) of the respondents had a high knowledge level before the intervention. The proportion of the respondents in all categories of knowledge was exactly the same after the intervention. No percentage shift in the proportion of respondents was observed at all levels of knowledge. Hence, no change in knowledge was observed in the control group. Findings of the study are consistent with the results of the studies conducted by Salim et al., (2020) and Widiyanto et al., (2019) where respondent's knowledge increased after the intervention. D'Cruz & Aradhya (2013) in their study also reported no change in control group after intervention.

Table 1. Knowledge level of the respondents on household waste management before and after the intervention

Study Groups	Extension Method	Level of knowledge	Before F (%)	After F (%)	Per cent Shift	z test
E1	Personal contact	Low (0-18)	8 26.67)	0(0.00)	-26.67	3.04*
		Medium (19-37)	13(43.33)	1(3.33)	-40.00	3.66*
		High (38-56)	9(30.00)	29(96.67)	66.67	-5.36*
E2	Personal contact + print material	Low (0-18)	24(80.00)	0(0.00)	-80.00	6.32*
		Medium (19-37)	4(13.33)	7(23.33)	10.00	-1.00
		High (38-56)	2(6.67)	23(76.67)	70.00	-5.5*
E3	Video conferencing	Low (0-18)	13(43.33)	0(0.00)	-43.33	4.07*
		Medium (19-37)	16(53.33)	6(20.00)	-33.33	2.68*
		High (38-56)	1(3.33)	24(80.00)	76.67	-6.02*
E4	Video conferencing + ICT based messages	Low (0-18)	12(40.00)	0(0.00)	-40.00	3.87*
		Medium (19-37)	17(56.67)	1(3.33)	-53.34	4.51*
		High (38-56)	1(3.33)	29(96.67)	93.34	-7.23*
C	No intervention	Low (0-18)	14(46.67)	14(46.67)	0.00	0
		Medium (19-37)	13(43.33)	13(43.33)	0.00	0
		High (38-56)	3(10.00)	3(10.00)	0.00	0

*Significant at 0.05 level of significance

Comparison of effectiveness of selected extension methods in terms of gain in knowledge

The data given in Table 2 highlights the mean knowledge score of the study groups before and after the intervention, and mean knowledge score with regard to gain in knowledge. The table also highlights the per cent gain in knowledge by the study groups exposed to different extension methods. It can be observed that before the intervention, experimental group 1 had a mean knowledge score of 28.20 whereas, after the intervention through the personal contact method the mean knowledge score increased to 51.37. An increase of 23.17 scores was reported through personal contact method that contributed to 82.16 per cent increase in the knowledge of the respondents of experimental group 1. Personal contact provides the opportunity to have a rapport with the respondents and makes the concepts understandable. In experimental group 2, before the intervention the mean knowledge score was 16.23 (least as compared to any other selected group), although after the intervention through the personal contact method + print materials the mean knowledge score increased to 45.87. The per cent gain in knowledge by the respondents was reported to be highest i.e. 182.56 per cent ($\bar{x}$ = 29.63 Gain in knowledge mean score). It can be stated that personal contact along with the supplementary material can help respondents to retain the knowledge for a longer time. This may have contributed to the maximum gain in knowledge of the respondents of experimental group 2. Experimental group 3 had a mean knowledge score of 23.03 before the intervention however after the intervention through video conferencing the mean knowledge score increased to 44.97. The per cent gain in knowledge by the respondents was 95.22 ($\bar{x}$ = 21.93 Gain in knowledge mean score). It can be observed that per cent gain in knowledge through video conferencing method was slightly more than the personal contact method. It may be due to the fact that in video conferencing method all the respondents were addressed at the same time and they were able to attend the session attentively without any break. In experimental group 4, before the intervention the mean knowledge score was 21.70 but after the intervention through video conferencing + ICT based messages the mean knowledge score increased to 52.37. The per cent gain in knowledge by the respondents was 141.34 ($\bar{x}$ = 30.67 Gain in knowledge mean score). It can be stated that delivery of information at the same time to all the respondents and follow-up messages in the following week may have contributed to the second highest gain in knowledge of the respondents. The control group that received no intervention showed a percent increase of only 2.38 per cent which is negligible.

It can be stated that after the intervention the mean knowledge score of all the study groups increased except the control group. The findings are in line with the results of the study conducted by Van Campenhout et al., (2021) which reported increase in knowledge of the respondents after the intervention through audio-visual methods. Statistical observations show that there was a significant difference in the mean knowledge scores of the study

Table 2. Comparison of selected extension methods in terms of gain in knowledge by the respondents

Groups	Extension Method	Mean Knowledge Score			Per cent gain in knowledge	F value	Significance
		Before intervention (Pre-knowledge test)	After intervention (Post-knowledge test)	Gain in knowledge			
E1	Personal contact	28.20 [a]	51.37 [a]	23.17 [b]	82.16		
E2	Personal contact + print material	16.23 [c]	45.87 [b]	29.63 [a]	182.56		
E3	Video conferencing	23.03 [a,b]	44.97 [b]	21.93 [b]	95.22	66.99	p <0.001
E4	Video conferencing + ICT based messages	21.70 [b,c]	52.37 [a]	30.67 [a]	141.34		
C	(No intervention)	21.01 [b,c]	21.60 [c]	0.50 [c]	2.38		

Means with different superscript in a column differ significantly

groups exposed to the selected extension methods (F=66.99, p<0.001). Personal contact method + print material extension method was the most effective in increasing knowledge of the respondents on household waste management followed by videoconferencing + ICT based messages, videoconferencing alone, and the least effective was personal contact extension method. However, the effect of personal contact + print material and video conferencing + ICT based messages on gain in knowledge by the respondents was statistically similar. Also, effect of video conferencing and personal contact method alone, was statistically similar. Therefore, it can be concluded that personal contact or online extension method should always be supplemented with educational materials for more effectiveness. Further, the effect of socio-personal characteristics such as age, education, occupation, family size and family education on gain in knowledge was checked statistically but no significant correlation was reported. Thus, it can be said that the intervention given through the selected extension methods was the only factor that affected the gain in knowledge by the respondents and it has no effect of socio-personal characteristics.

CONCLUSION

The study revealed the comparative effectiveness of personal and online extension methods in disseminating knowledge to the respondents on household waste management. Though all the selected extension methods were effective in disseminating knowledge to the respondents, the highest effect on gain in knowledge by the respondents was observed through personal contact method supplemented with print material followed by videoconferencing method supplemented with ICT based messages then videoconferencing alone, and personal contact method alone. Statistically, the solo usage of the personal and online extension methods had similar effects on gain in knowledge by the respondents. Statistically similar effects on gain in knowledge by the respondents were also observed when the personal and online extension methods were supplemented with educational materials. Therefore the study concludes that personal contact or online extension method should always be supplemented with educational materials for more effectiveness.

REFERENCES

Asteria, D., & Haryanto, J. T. (2021). Empowerment key factors in shaping women's awareness of household waste management. *Global Journal of Environmental Science nd Management, 7*(3), 317-330. https://dx.doi.org/10.22034/GJESM.2021.03.01

Barton, E. T., Barton, E. A., Barton, S., Boyer, C. R., Brosnan, J., Hill, P., Hoyle, J., Reid, J., Serger, J., & Stafne, E. (2017). Using technology to enhance extension education and outreach. *HortTechnology*, *27*(2), 177-186.

Capila, A., & Sachdev, N. (2010, April 5). *Video for Participatory Communication: An Exploratory Study Conducted with Video SEWA Cooperative in Ahmedabad*. Retrieved August 15, 2021, from https://files.eric.ed.gov/fulltext/ED520300.pdf

D'Cruz, A. M., & Aradhya, S. (2013). Impact of oral health education on oral hygiene knowledge, practices, plaque control and gingival health of 13to 15 year old school children in Bangalore city. *International Journal of Dental Hygiene, 11*(2), 126-133. https://doi.org/10.1111/j.1601-5037.2012.00563.x

Hoornweg, D., & Bhada-Tata, P. (2012, March). *What a Waste: A Global Review of Solid Waste Management.* Retrieved April 10, 2021, from https://openknowledge.worldbank.org/handle/10986/17388

Kaza, S., Yao, L., Bhada-Tata, P., & Van Woerden, F. (2018, September 20). *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. Retrieved November 15, 2021, from https://openknowledge.worldbank.org/handle/10986/30317

Kumari, M., Dhawal, K. K., & Bhumra, H. (2019). Extension agency contact and technology sharing among trainee and non-trainee layer farmers. *Indian Journal of Extension Education, 55*(2), 31-34.

Mahra, G. S., Kumar, B., Bhardwaj, N., & Dash, D. (2017). Trends in extension research in India-a case study. *Indian Journal of Extension Education, 53*(4), 25-31.

O'Donnell, S. (2009). How K-Net and Atlantic Canada's First Nation Help Desk are Using Videoconferencing for Community Development. *Journal of Community Informatics, 5*, 2.

Olawale, I. F., Olayiwola, I. F., Wahab, A. A., Salami, T. S., & Sani, B. (2013). The mass media and ICT: predictable strategies for sustainable extension Services in Nigeria. *IOSR Journal of Humanities and Social Sciences, 9*(5), 71-76.

Patel, D., Singh, S., Verma, A. P., Gupta, B. K., & Singh, M. (2019). Impact of Different Extension Teaching Methods for Adoption of Scientific Package of Practices of Chickpea. *Indian Journal of Extension Education, 55*(2), 91-93.

Salim, N. A., Tuffaha, M. G., & Brant, J. M. (2020). Impact of a pain management program on nurses' knowledge and attitude toward pain in United Arab Emirates: Experimental-four Solomon group design. *Applied Nursing Research, 54*, 151314.

Van Campenhout, B., Spielman, D. J., & Lecoutere, E. (2021) Information and communication technologies to provide agricultural advice to smallholder farmers: Experimental evidence from Uganda. *American Journal of Agricultural Economics, 103*(1), 317-337.

Widiyanto, A. F., Suratman, S., Alifah, N., Murniati, T., & Pratiwi, O. C. (2019). Knowledge and practice in household waste management. *Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal), 13*(3), 112-116.

Yoada, R. M., Chirawurah, D., & Adongo, P. B. (2014). Domestic waste disposal practice and perceptions of private sector waste management in urban Accra. *BMC Public Health, 14*(1), 1-10. https://doi.org/10.1186/1471-2458-14-697