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Utilization pattern and perceived utility of IVRI-biosecurity and biosafety app

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Abstract
The study was conducted in Uttar Pradesh purposively keeping in view its 1st rank in milk and meat production. The sample of the study were commercial dairy, pig and poultry farmers. Total sample size was 120 (40 from each category) who were surveyed through face-to-face interview by using semi-structured interview schedule. ICAR-IVRI has developed a mobile app on Biosecurity and Biosafety to provide information and knowledge to the livestock and poultry farmers regarding on farm biosecurity measures. The entire content for mobile app was developed by referring the relevant literature along with consultation with subject experts. The app was placed on Google Play store and widely promoted among the livestock and poultry farmers for enhancing its utility through WhatsApp and other social media platforms. The effectiveness of the app was studied by assessing the utilization pattern of app and its perceived utility among 120 respondents. Results revealed that majority i.e. 55.00 percent were using the IVRI-Biosecurity and Biosafety app sometimes followed by 26.66 percent who were using it frequently. Similarly, 79.16 percent were using the app to check biosecurity level of their farm. The overall perceived utility of the app was found to be high with a score of 29.48 out of 40.

Keywords: Biosecurity, dairy, pig, poultry, mobile app

Introduction
Livestock productivity has witnessed an incremental trend over the years [1, 35-37]. The increased livestock productivity is mainly achieved because of elite genetic resources clubbed with better management [2-6, 39, 40]. Along with production, the waste production has also increased [7-11]. The overall increase in production and types of wastes has led to the development of new vectors, thus leading to various diseases [12-15]. These diseases can be prevented by using suitable biosecurity and biosafety measures which needs to be adopted by the farmers, for which their behaviour needs to be studied [16-18]. Many researchers have emphasized that newly developed means of information and communication technologies along with conventional extension strategies can bring a positive change in the behaviour of the farmers [19-24, 38].

Due to technological developments and faster communication, animals and animal products have started moving around different parts of the world in a short period. Globalization has resulted in boosted trade in livestock and livestock products which may lead to increased risk of disease outbreak among the livestock. Animal diseases pose major threats to livestock sectors globally [25, 42]. In developing countries, where livestock contribute a huge proportion to livelihood, the impacts of animal disease and its consequences on poverty, is challenging to recompense [26, 27]. It is of utmost importance to prevent disease outbreaks on farms as these can cause substantial losses in terms of farm profitability as well as long term adverse effects on the health of an animal along with persons associated with it. Hence, biosecurity is a very crucial concept as it holds all measures to prevent pathogens from entering the farm and reducing the spread of pathogens within a farm [28]. According to the research conducted by Chauhan *et al.* (2019) [29] on bovine TB, it is apparent that due lack of awareness, knowledge among the farmers regarding the prevention and control of disease was completely absent [29]. Singh *et al.* (2006) [30] in a study on outbreak of buffalo pox in Aurangabad, India also suggested careful monitoring of the disease along with education of farmers and other

Livestock handlers on control measures such as restraint of movement of animals with showing lesion, basic sanitation practices within and between herd biosecurity [30]. The adoption of biosecurity measures reduces the risk of diseases and indirectly augment farmers' income.

According to Bell *et al*. (2016) [31], smartphones possess significant potential to foster greater involvement of rural communities in an effective exchange of information [31]. In a literature review by Revere *et al*. (2007) [32], it was noted that public health practitioners seek easily accessible and up-to-date information sources that are cost-effective and relevant to their field [32, 41]. Therefore, information systems should prioritize regular updates to meet these information needs. Keeping these facts into consideration, the study was targeted to develop an effective mobile app on biosecurity which can further strengthen the knowledge of livestock and poultry farmers regarding various biosecurity measures to control disease outbreak.

Materials and Methods

The study was purposively conducted in Uttar Pradesh state during the year 2021. The sample of the study were commercial livestock and poultry (broiler) farmers of selected area. A total of 120 respondents, 40 from each group i.e. dairy, piggery and poultry (broiler) were selected for the study. A preliminary documentation was done on available commercial dairy, piggery and poultry farms in Uttar Pradesh through digitally available sources such as Google maps, You Tube, online trading sites such as Indiamart, Just dial etc. Also few resources on beneficiary list of Poultry policy scheme of State Department of Animal Husbandry, UP were documented. With the help of these information sources, an exhaustive list of commercial dairy farms, pig farms and poultry farms along with address and phone numbers was prepared. This list had been considered as the sampling frame for the proposed study and a random sample was drawn from it. Direct face-to-face interview with semi-structured interview schedule and online survey Google forms were used to collect data. The IVRI-Biosecurity and Biosafety app was developed after consultation with subject experts and referring various already available literatures, keeping in view the existing need of the app. Content of the app was developed separately under three sections *viz*., biosecurity and biosafety in dairy, pig and poultry farms and was validated by respective subject experts in field of dairy, piggery and poultry. Suitable photographs were collected for incorporation in the app. After its placement on Google Playstore, link was shared among the sample farmers to assess the utilization pattern and perceived utility of the app. The utilization pattern as studied under 2 components *viz*., frequency of use and purpose of using the app. Similarly, the perceived utility of the app was assessed under ten components. The respondents were asked to give score to each component in four-point continuum i.e. Very Good (4), Good (3), Average (2) and Poor (1) and mean score was calculated accordingly.

$$MS = \frac{\sum_{i=1}^{n} \text{Total Score}_i}{k}$$

Where k= total number of respondents
MS: Mean score

Results and Discussion

Utilization pattern of app

Frequency of use

The frequency of use of app was assessed from the respondents and results given in Table no. 1 reveals that majority i.e. 55.00 percent were using the IVRI-Biosecurity and Biosafety app sometimes followed by 26.66 percent who were using it frequently. The mean score of use was 2.36. In case of dairy farmers about 57.50 percent were sometimes using the app followed by 22.50 percent who were frequently using it. About 50.00 percent of pig farmers were sometimes using the app followed by 30.00 percent who were using it frequently. In case of poultry farmers, majority (52.50%) were sometimes using the app followed by 27.50 percent who were frequently using it.

Table 1: Distribution of respondents according to the frequency of use of IVRI-Biosecurity and Biosafety app

Frequency of use	VF (4)	F (3)	S (2)	R (1)	Average score
Dairy farmers (n=40)	3 (7.50)	9 (22.50)	23 (57.50)	5 (12.50)	2.25
Pig farmers (n=40)	4 (10.00)	12 (30.00)	22 (50.00)	2 (15.00)	2.45
Poultry farmers (n=40)	4 (10.00)	11 (27.50)	21 (52.50)	4 (10.00)	2.37
Pooled (N=120)	11 (9.16)	32 (26.66)	66 (55.00)	11 (9.16)	2.36

(VF: Very Frequently, F: Frequently, S: Sometimes, R: Rarely; Figures in parenthesis indicate percentage)

Purpose of using IVRI-Biosecurity and Biosafety app

The respondents were asked about the purpose of using the app. Results shown in Table no. 2 depicts that a great majority i.e. 79.16 percent were using the app to check biosecurity level of their farm. About 73.33 percent reported to be using it to improve knowledge regarding biosecurity. A wholesome number of respondents (56.66%) were using it to improve biosecurity measure of farm and to gather information on disinfectant respectively.

Table 2: Distribution of respondents according to purpose of use app

Purpose of using IVRI-Biosecurity and Biosafety app	Dairy farmers (n=40)	Pig Famers (n=40)	Poultry farmers (n=40)	Pooled (N=120)
To improve knowledge regarding biosecurity and biosafety	28 (70.00)	30 (75.00)	30 (75.00)	88 (73.33)
To improve biosecurity measures on farm	22 (55.00)	21 (52.50)	25 (62.50)	68 (56.66)
To check the actual biosecurity level of farm	30 (75.00)	32 (80.00)	33 (82.50)	95 (79.16)
To gather information on various disinfectants	21 (52.50)	22 (55.00)	25 (62.50)	68 (56.66)

Figures in parenthesis indicate percentage

Perceived utility of app

Perceived utility of the app was assessed under ten components *viz*., usefulness, user-friendliness, attractiveness, compatibility with mobile, soundness of visuals, complete coverage of content, interactivity, language, credibility, appropriateness of vocabularies and terminologies. The results shown in Table no. 3 reveal that the overall perceived utility score was 29.48 out of 40. In case of dairy farmers, the reported perceived utility score was 29.12. In case of pig farmers, it was found to be 29.37 whereas in case of poultry

farmers, it was 29.87. Among the ten components, perceived utility in term of language got highest score i.e. 3.20 followed by compatibility with mobile (MS=3.16) and complete coverage of content with score of 3.11. This goes in line with Mittal *et al.* (2010) [33] who discovered that the quality, timeliness, and trustworthiness of information were crucial factors that facilitated farmers' utilization of the information [33]. Similar study was conducted by Panda *et al.* (2021) [24] who reported that perceived utility of mobile app was found to be good [6]. Similarly, in a study conducted by Teza (2016) [34] regarding the credibility of information, the majority of respondents regarded information accessed through mobile apps as trustworthy and accurate, providing complete and adequate information [34]. These findings align with the current research, reinforcing the importance of reliable and comprehensive information for effective engagement.

Table 3: Distribution of respondents according to the perceived utility of app

Perceived utility of the app	(N=120)				
	VG	G	AV	P	MS
Usefulness	35 (29.16)	51 (42.50)	21 (17.50)	13 (10.83)	2.93
User-friendliness	35 (29.16)	55 (45.83)	18 (15.00)	12 (10.00)	3.04
Attractiveness	28 (23.33)	50 (41.66)	25 (20.83)	17 (14.16)	2.74
Compatibility with mobile	43 (35.83)	58 (48.33)	14 (11.66)	5 (4.16)	3.16
Soundness of visuals	22 (18.33)	50 (41.66)	32 (26.66)	16 (13.33)	2.65
Complete coverage of content	37 (30.83)	63 (52.50)	17 (14.16)	3 (2.50)	3.11
Interactivity	18 (15.00)	51 (42.50)	30 (25.00)	21 (17.50)	2.74
Language	44 (36.66)	60 (50.00)	12 (10.00)	4 (3.33)	3.20
Credibility	49 (40.83)	47 (39.16)	18 (15.00)	6 (5.00)	3.13
Appropriateness of vocabulary and terminologies	24 (20.00)	51 (42.50)	26 (21.66)	19 (15.83)	2.77
Overall perceived utility score					29.48

Figures in parenthesis indicate percentage

Conclusion

On studying the utilization pattern and perceived utility of the developed app, the results showed that majority of the respondents were sometime using the app followed by few farmers who were using the app frequently. Majority were using the app to check biosecurity level of their farm and also to improve knowledge regarding biosecurity. The perceived utility of the app was good with a very high average perceived utility score. Among the ten component, perceived utility in term of language got highest score i.e. 3.20 as the app has been developed in Hindi language followed by compatibility with mobile (MS=3.16) and complete coverage of content with score of 3.11. The developed mobile app can act as a very good tool for providing knowledge and information regarding various biosecurity measures in local language. The developed videos linked to it can help the farmers to follow all the necessary safety measures effectively which can further help to control and prevent disease outbreak and spread. The mobile app can be used by various livestock and poultry farmers to assess their on- farm biosecurity score as well. Awareness and short duration trainings need to be organised for improving the competency of farmers in using the developed app as well as other mobile apps for information access.

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