



Consumer Demand and Market Requirements for Sustainable Goat Production in Vietnam: Implications for Extension Education

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HIGHLIGHTS

- Restaurants are the principal channel for goat meat consumption in Vietnam.
- Domestic goats account for most goat meat supplied to restaurants.
- Consumer demand is influenced by food safety, origin and traceability.
- Market-oriented extension is essential for sustainable goat sector development.

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ABSTRACT

The study examined consumer demand, restaurant purchasing preferences, and market requirements for goat meat in Vietnam and discussed implications for market-oriented extension. Data were collected from 86 goat meat restaurant owners/managers and 509 consumers across ten provinces and cities in Northern and Central Vietnam. Descriptive statistics and Pearson's Chi-square tests were used for data analysis. The goat meat consumption was strongly associated with restaurant-based dining. Significant relationships were found between consumption frequency and place of consumption ($\chi^2 = 17.476$, $p = 0.002$) and between consumption frequency and preferred product form ($\chi^2 = 26.934$, $p < 0.001$). More than half of consumers (54.8%) preferred processed goat meat dishes, while food safety, product origin, and traceability were identified as the most important purchasing attributes. Restaurants consumed an average of 98.8 goats per month and relied mainly on traders (67.2%) for supply. Restaurant owners preferred Vietnamese Co goats (a type of indigenous goat breed), Vietnamese crossbred goats and animals weighing 20–30 kg. The findings from this study highlight the need for market-oriented extension programmes that integrate technical husbandry training, food safety standards, market information, entrepreneurship development and value-chain linkages to improve the competitiveness and sustainability of goat production in Vietnam.

INTRODUCTION

Goat production is an important livelihood activity for smallholder farmers in many developing countries because of its contribution to food security, income generation, and poverty reduction. Goats require relatively low investment, adapt well to diverse agroecological conditions, and efficiently utilize locally

available feed resources, making them particularly suitable for resource-poor households (FAO, 2011; Olmo et al., 2024). In Vietnam, goat farming plays an important role in mountainous and upland areas, where alternative livestock production opportunities are often limited (Nguyen et al., 2021; Don et al., 2023).

The goat sector in Vietnam has expanded steadily during the past decade. The national goat population increased from

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approximately 2.68 million head in 2018 to nearly 2.95 million head in 2024, reflecting the growing importance of goat production within the livestock sector (Livestock & Veterinary Information Center, 2024). Rising household incomes, urbanization and changing dietary preferences have stimulated demand for high-quality animal-source foods. Consumers are increasingly concerned about food safety, product quality, and traceability, while the rapid expansion of goat meat restaurants has further strengthened market demand (Phuong et al., 2014; Olmo et al., 2024). Previous studies have shown that restaurants constitute an important marketing channel for goat meat in Vietnam, creating strong linkages among producers, traders, and food service enterprises (Gray et al., 2019; Nguyen et al., 2023).

Despite favourable market prospects, goat production remains constrained by small-scale production systems, limited technical knowledge, weak market coordination, and poor integration into formal value chains (Gunaseelan & Singh, 2018; Don et al., 2023). Information gaps related to breeding, feeding, animal health, and marketing further reduce farmers' ability to respond effectively to changing market requirements (Sinha et al., 2017). These challenges highlight the need for extension services that provide not only technical advice but also market information and business-oriented support. Credit linked Production and Procurement Model and on door procurement models have gained importance to handle marketing issues (Kumari et al., 2022).

Market-oriented extension has emerged as an important approach for improving the competitiveness and sustainability of livestock production. Unlike conventional production-focused extension, this approach integrates consumer preferences, market requirements, value-chain coordination, and entrepreneurship into advisory services, enabling farmers to make production decisions that better respond to market opportunities. Such an approach is particularly relevant to goat production, where consumer demand increasingly emphasizes food safety, product origin, and traceability.

Although previous studies have examined goat production systems and value chains in Vietnam, empirical evidence on consumer demand, restaurant purchasing preferences and market requirements remains limited. Such information is essential for developing market-oriented extension programmes and strengthening value-chain linkages. Therefore, this study aimed examine consumer demand, restaurant purchasing preferences, and market requirements for goat meat in Vietnam and discuss their implications for market-oriented extension programmes supporting sustainable goat production.

METHODOLOGY

The study was conducted in ten provinces and cities in Northern and Central Vietnam, including Son La, Hoa Binh, Dien Bien, Hanoi, Nghe An, Ha Tinh, Quang Binh, Quang Tri, Da Nang, and Thua Thien Hue. These locations were purposively selected because they represent major goat-producing and goat meat-consuming areas and have relatively developed goat marketing networks. The study targeted two key stakeholder groups within the goat value chain: (i) goat meat restaurant owners/managers and (ii) goat meat consumers. Restaurant respondents were selected purposively based on their specialization in goat meat products

and a minimum of three years of business operation. Consumer respondents were randomly interviewed at restaurants, traditional markets, supermarkets, residential areas, and other public locations to ensure diversity in consumption patterns and socio-economic backgrounds. A total of 86 restaurant owners/managers and 509 consumers participated in the survey. Primary data were collected by using structured questionnaires and face-to-face interviews conducted by trained enumerators. Separate questionnaires were designed for restaurant owners and consumers. The restaurant survey collected information on goat procurement practices, supply sources, purchasing frequency, preferred goat breeds and slaughter weights, perceptions of market trends, and quality requirements for goat meat products. The consumer survey focused on goat meat consumption behaviour, preferred product attributes, food safety concerns, product origin, and traceability requirements. Respondents' perceptions of quality-related attributes were assessed using a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

The study examined consumer demand and market requirements for sustainable goat production. Key variables included consumption frequency, place of consumption, preferred product forms, goat procurement patterns, preferred goat breeds, preferred slaughter weights, perceived market trends, and consumer evaluations of goat meat quality attributes.

Descriptive statistics, including means, standard deviations, and percentages were used to summarize consumption patterns, purchasing behaviour, market trends, and quality preferences. Mean scores were employed to assess the relative importance of quality attributes such as food safety, product origin, traceability, freshness, and organic production. Pearson's Chi-square tests were used to examine associations between consumption frequency and place of consumption, and between consumption frequency and preferred product forms. The findings were interpreted to identify market-oriented extension implications for sustainable goat production and value chain development in Vietnam. Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 26.0.

RESULTS

Goat meat consumption behaviour of consumers

The results presented in Table 1 show that goat meat was consumed relatively infrequently by most respondents. Approximately 90.4% of consumers reported consuming goat meat less than once per month, indicating occasional rather than regular consumption, while 8.8% consumed goat meat one to two times per month and only 0.8% consumed it three or more times per month. It should be noted that respondents in the less than once per month category were occasional consumers rather than non-consumers, as all survey participants had previous experience consuming goat meat. These findings suggest that goat meat remains a niche livestock product and is typically consumed on special occasions or when dining out, rather than as a routine source of animal protein in most households. Regarding product preferences, more than half of the respondents (54.8%) preferred processed goat meat dishes, whereas 28.5% preferred fresh goat meat for home preparation. A further 16.7% reported consuming both fresh and

Table 1. Goat meat consumption behaviour among surveyed consumers (n = 509)

Indicator	Category	Value (%)
Frequency of consumption	Less than once/month	90.4
	1–2 times/month	8.8
	≥3 times/month	0.8
Preferred product form	Fresh goat meat	28.5
	Processed goat meat dishes	54.8
	Both	16.7

processed goat meat products. The preference for processed goat meat dishes suggests that convenience and restaurant-based consumption play important roles in shaping consumer demand.

Table 2 presents the distribution of place of consumption within each consumption frequency category (row percentages), whereas Table 1 summarizes the overall distribution of respondents by consumption frequency. The relationship between consumption frequency and place of consumption is presented in Table 2. The Chi-square test revealed a significant association between these variables ($\chi^2 = 17.476$, $p = 0.002$). Restaurants were the primary venue for goat meat consumption across all consumer groups. Among respondents who consumed goat meat less than once per month, 67.8% reported consuming it mainly at restaurants, compared with 61.3% among those consuming goat meat one to two times per month and 52.6% among frequent consumers. Consumers with higher consumption frequency were relatively more likely to consume goat meat both at home and in restaurants.

Findings from this study suggest that restaurant-based consumption plays a dominant role in the goat meat market and constitutes an important driver of consumer demand.

The results presented in Table 3 showed a significant association between goat meat consumption frequency and preferred product form ($\chi^2 = 26.934$, $p < 0.001$). Processed goat meat dishes were the most preferred product form across all consumption groups, accounting for 67.7% of consumers who consumed goat meat less than once per month, 61.3% of those consuming goat meat one to two times per month, and 52.6% of frequent consumers.

In contrast, preference for both fresh and processed goat meat products was more common among consumers with higher consumption frequency. It accounted for 12.5% respondents consuming goat meat less than once per month, 25.8% of those consuming goat meat one to two times per month, and 47.4% of respondents consuming goat meat three or more times per month.

Table 2. Association between consumption frequency and place of consumption (Row percentages, n = 509)

Consumption frequency	Home (%)	Restaurant (%)	Both (home and restaurant) (%)
< 1 time/month	19.7	67.8	12.5
1–2 times/month	13.4	61.3	25.3
≥ 3 times/month	31.6	52.6	15.8
χ^2 value	17.476		
p-value	0.002		

Note: Percentages are row percentages calculated within each consumption frequency category and may differ from the overall percentages presented in Table 1.

Preference for fresh goat meat alone remained relatively low across all groups and was not reported among consumers who consumed goat meat three or more times per month. These findings suggest that consumption frequency is associated with consumer preferences for goat meat products. Consumers with lower consumption frequency tended to prefer processed goat meat dishes, which are commonly consumed in restaurants, whereas more frequent consumers exhibited more diversified preferences, including both fresh and processed goat meat products. The results further highlight the important role of restaurant-based goat meat dishes in stimulating consumer demand and shaping consumption behaviour in Vietnam.

Table 3. Association between consumption frequency and preferred product form (Row percentages)

Consumption frequency	Fresh goat meat (%)	Processed goat meat dishes (%)	Both (Fresh and Processed goat meat) (%)
< 1 time/month	19.8	67.7	12.5
1–2 times/month	12.9	61.3	25.8
≥ 3 times/month	0	52.6	47.4
χ^2 value	26.934		
p-value	0.000		

Note: Percentages are row percentages calculated within each consumption frequency category.

Consumer perceptions of goat meat quality

Consumer evaluations of goat meat quality attributes are presented in Table 4. Food safety received the highest mean score ($M = 4.4$), followed by product origin, traceability, and organic production practices ($M = 4.1$ for each attribute). In contrast, freshness received the lowest mean score ($M = 3.5$), although it remained above the midpoint of the scale. These findings suggest that consumers place considerable importance on food safety, product origin, traceability, and production practices when purchasing goat meat. The relatively low standard deviations ($SD = 0.5$ – 0.7) indicate a high degree of agreement among respondents regarding the importance of these quality attributes.

Goat meat consumption and supply sources in surveyed restaurants

Table 5 presents the purchasing frequency and supply sources of goat meat among the surveyed restaurants. More than 65% of

Table 4. Consumer evaluation of goat meat quality (n = 509)

Criteria	Mean (M)	Standard Deviation (SD)
Freshness	3.5	0.6
Product origin	4.1	0.6
Food safety	4.4	0.5
Traceability	4.1	0.6
Organic production	4.1	0.7

Note: Perceptions of goat meat quality criteria were measured using a five-point Likert scale, where 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree.

Table 5. Goat purchasing frequency and supply sources among surveyed restaurants (n = 86)

Frequency and Supply Sources	Category	Value (%)
Frequency of goat purchasing	Daily	65.1
	Every few days	31.4
	Weekly	2.3
	Every two weeks	1.2
Form of goat meat purchasing	Live goats	47.7
	Slaughtered goats	39.5
	Both forms	12.8
Sources of goat meat supply	Smallholder farmers	19.6
	Traders	67.2
	Slaughterhouses	13.2

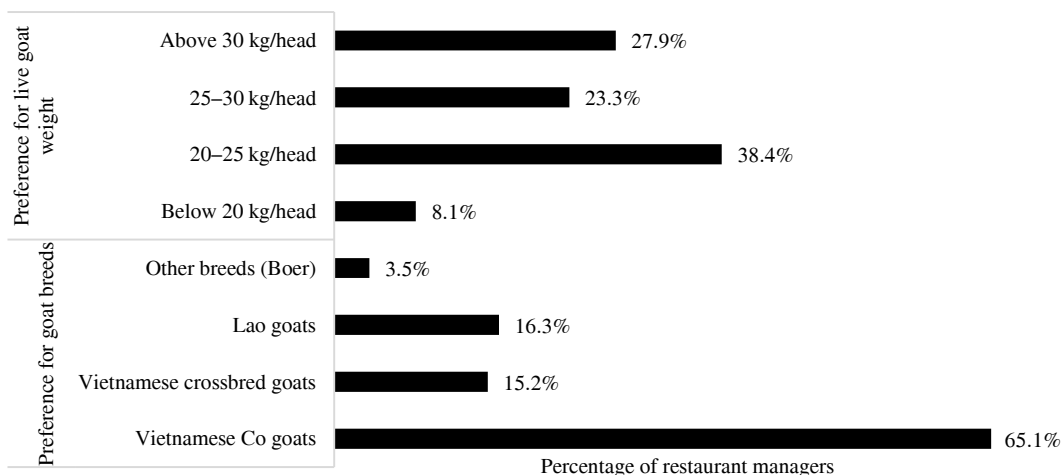
restaurants purchased goats daily, while 31.4% purchased goats every few days, which is approximately one-third. Only a small proportion of restaurants purchased goats weekly or less frequently. Live goats were the most common form of purchase, accounting for 47.7% of respondents, followed by slaughtered goats (39.5%), while 12.8% purchased both live and slaughtered goats. Traders were the primary suppliers of goats, accounting for 67.2% of purchases, followed by smallholder farmers (19.6%) and slaughterhouses (13.2%).

Origin and sources of goats consumed in restaurants

The origin of goats consumed by surveyed restaurants is presented in Table 6. On average, each restaurant consumed approximately 98.8 goats per month, indicating substantial demand for goat meat among restaurant-based markets. Vietnamese

Table 6. Origin of goats consumed by surveyed restaurants

Goat origin	Mean (Heads/ month)	Standard Deviation (SD)	Percentage (%)
Vietnamese crossbred goats	50.1	45.6	50.7
Vietnamese Co goats	27.5	39.1	27.8
Lao goats	20.5	45.9	20.7
Imported goats from other countries	0.7	6.3	0.8
Total	98.8	11.2	100

Figure 1. Preferred characteristics of meat goats by restaurants

crossbred goats accounted for the largest share of total consumption, with an average of 50.1 heads per restaurant per month, representing 50.7% of all goats consumed. Indigenous Vietnamese Co goats ranked second, with an average consumption of 27.5 heads per month (27.8%), followed by goats imported from Laos, which accounted for 20.5 heads per month (20.7%). Goats imported from other countries contributed only a negligible proportion of total consumption (0.8%).

The relatively high standard deviations observed for Vietnamese crossbred goats (SD = 45.6), Vietnamese Co goats (SD = 39.1), and Lao goats (SD = 45.9) indicate considerable variation in sourcing patterns among restaurants. This variation may reflect differences in restaurant size, customer demand, local supply availability, and procurement strategies. Overall, domestic goats accounted for approximately 78.5% of total goat consumption, demonstrating that local production remains the primary source of supply for the restaurant sector. Nevertheless, the substantial contribution of Lao goats highlights the growing role of cross-border trade in meeting increasing market demand. The predominance of Vietnamese crossbred and indigenous Co goats suggests that these goat types are highly preferred by restaurant operators and constitute the principal sources of goat meat supplied to consumers in Vietnam.

Restaurant preferences for goat meat quality

The preferred characteristics of goats used by restaurants are presented in Figure 1. Indigenous Vietnamese Co goats were the most preferred breed, accounting for 65.1% of respondents. Lao goats and Vietnamese crossbred goats were preferred by 16.3% and 15.2% of respondents, respectively, while only a small proportion (3.5%) preferred other breeds such as Boer goats. Restaurant owners generally preferred medium-sized goats. The most preferred weight category was 20–25 kg/head (38.4%), followed by over 30 kg/head (27.9%) and 25–30 kg/head (23.3%). Only 8.1% of respondents preferred goats weighing less than 20 kg/head. These findings suggest that restaurant owners generally favor indigenous goat breeds and goats weighing between 20 and 30 kg live weight, which together accounted for 61.7% of responses.

Perceived market trends in the goat meat sector

The perceptions of restaurant owners regarding recent changes in the goat meat market are presented in Table 7. More than one-

Table 7. Perceived market trends in the goat meat sector according to restaurant owners (%)

Indicator	Unchanged	Increased	Decreased	Do not know
Live goat price	51.2	39.5	5.8	3.5
Goat supply	66.3	9.3	19.8	4.6
Number of goat meat restaurants	47.7	27.9	20.9	3.5
Consumer demand for goat meat	32.6	24.4	32.6	10.4

third of the respondents (39.5%) reported that live goat prices had increased in recent years, while 51.2% perceived prices as relatively stable. Only 5.8% believed that goat prices had decreased. These findings suggest that live goat prices have generally remained stable or increased over time. Two-thirds of the restaurant owners (66.3%) indicated that goat availability had remained relatively unchanged, whereas 19.8% reported a decline in supply. Only 9.3% observed an increase in goat availability. This suggests that respondents generally perceived goat supply as stable, although some concerns regarding supply constraints were reported. Restaurant owners also perceived mixed trends in the development of the goat meat sector. Nearly 28% reported an increase in the number of goat meat restaurants, while about 48% considered the number relatively stable. Similarly, 24.4% of respondents observed increasing consumer demand for goat meat, whereas 32.6% perceived demand as stable and an equal proportion reported declining demand. Overall, the results indicate that restaurant owners generally perceived the goat meat market as relatively stable, particularly with respect to prices, supply, and the number of goat meat restaurants. However, perceptions regarding consumer demand were more varied, suggesting differing experiences across locations and market segments.

DISCUSSION

The findings suggest that goat meat consumption in Vietnam is strongly associated with the expansion of food service establishments and changing consumer preferences. The average consumption of approximately 99 goats per restaurant per month highlights the substantial commercial importance of the goat sector. This result supports previous studies reporting that demand for goat meat in Vietnam has increased steadily in recent years and is expanding faster than domestic production capacity (Olmo et al., 2024). Similar patterns have been observed in many developing countries where rising incomes, urbanization, and dietary diversification have stimulated demand for high-value animal-source foods (FAO, 2011).

The predominance of restaurant-based consumption observed in this study reflects ongoing changes in food consumption behaviour in Vietnam. The Chi-square analysis revealed a significant association between goat meat consumption frequency and place of consumption ($\chi^2 = 17.476$, $p = 0.002$), indicating that restaurants constitute the primary venue for goat meat consumption across different consumer groups. More than half of the respondents in all consumption-frequency categories reported consuming goat meat mainly at restaurants, highlighting the central role of food service

establishments in the goat meat market. This finding suggests that goat meat is increasingly perceived as a specialty food consumed in social and dining-out settings rather than as a routine household food item.

The growing importance of restaurant-based consumption is consistent with broader changes in dietary patterns associated with urbanization, rising incomes, and increasing demand for convenience foods. Similar observations were reported by Nguyen et al. (2023), who identified restaurants as the principal marketing channel for goat meat in Central Vietnam. Likewise, Phuong et al. (2014) noted that eating outside the home has become increasingly common among Vietnamese consumers as lifestyles and food preferences continue to evolve. The predominance of processed goat meat dishes preferred by consumers further reinforces the importance of restaurants in shaping market demand and consumption patterns.

From a market development perspective, the continued expansion of goat meat restaurants represents an important driver of demand growth and creates opportunities for producers, traders, and other actors along the goat value chain. The findings imply that extension programmes and livestock development initiatives should not only focus on improving farm-level productivity but also strengthen farmers' capacity to meet the quality, consistency, and food safety requirements of restaurant-based markets. Enhancing linkages between producers and restaurant operators could improve market access, support value addition, and contribute to the sustainable development of the goat sector in Vietnam.

The study also revealed a strong preference among restaurant owners for indigenous Vietnamese goats and Vietnamese crossbred goats. These breeds may be preferred because of their perceived meat quality attributes, although further research is needed to identify the specific characteristics influencing consumer and restaurant preferences. Previous studies have likewise reported that local goat breeds are often associated with natural grazing systems and superior eating quality (Gray et al., 2019; Hung et al., 2014). This preference highlights the importance of maintaining and improving local genetic resources while enhancing productivity through better feeding and management practices.

Consumer evaluations further indicate that food safety, product origin, and traceability are key determinants of purchasing decisions. The high ratings assigned to these attributes suggest that consumer preferences are gradually shifting from quantity-based consumption toward quality-oriented consumption. Similar trends have been reported by Don et al. (2023), who observed increasing consumer concern regarding product quality, food safety, and traceability within Vietnam's goat meat market. These findings are also consistent with broader international evidence showing that urban consumers increasingly demand safe and transparently sourced livestock products (FAO, 2011).

The perceived market trends reported by restaurant owners further support the existence of favorable market conditions for goat production. A substantial proportion of respondents indicated increasing goat prices and growing numbers of goat meat restaurants, while demand was generally perceived as stable or increasing. While many respondents perceived goat supply as stable and relatively few respondents reported increases in supply, perceptions regarding consumer demand were more varied. Nevertheless, the findings may

indicate concerns about the ability of domestic production systems to respond to changing market conditions. Similar observations were reported by Olmo et al. (2024), who highlighted the widening gap between goat meat demand and domestic supply in Vietnam.

From an extension education perspective, these findings emphasize the importance of strengthening market-oriented advisory services for goat producers. Sustainable livestock development increasingly requires farmers to understand not only production technologies but also consumer preferences, quality requirements, and market opportunities. Sinha et al. (2017) reported that goat farmers expressed substantial information needs regarding breeding, feeding, disease management, and marketing practices, while access to reliable information remained limited. Likewise, Gunaseelan and Singh (2018) identified technical knowledge gaps, marketing constraints, and inadequate institutional support as major challenges affecting commercial goat farming enterprises. The results of the present study suggest that extension programmes should integrate market information, quality standards, food safety practices, and value chain development into farmer training activities.

The findings also highlight opportunities for entrepreneurship and value chain development in the goat sector. Growing consumer demand creates potential for smallholder farmers and rural youth to engage in goat production, fattening, trading, and other value-added enterprises. Sharma and Singh (2023) demonstrated that entrepreneurship-oriented training programmes improved managerial skills and enterprise development capacities among livestock farmers. In addition, the heavy reliance of restaurants on traders for goat procurement indicates that marketing channels remain fragmented. Similar challenges have been reported in livestock value chains across developing countries, where weak coordination among value chain actors often limits product quality control and market efficiency (Gray et al., 2019; Namonje-Kapembwa et al., 2022). Strengthening linkages among producers, traders, processors, and restaurant operators could therefore improve traceability, market access, and economic returns for smallholder goat farmers.

Overall, the findings suggest that the sustainable development of goat production in Vietnam will depend on improving production efficiency while simultaneously responding to evolving market requirements. Extension services can contribute significantly by facilitating access to technical and market information, strengthening farmer capacities, and supporting the development of more integrated and market-responsive goat value chains.

CONCLUSION

The study assessed consumer demand and market requirements for sustainable goat production in Vietnam. The goat meat restaurants are the principal marketing channel and an important driver of market demand. Surveyed restaurants preferred Vietnamese crossbred goats, indigenous Co goats, and animals weighing 20–30 kg raised under semi-grazing and natural grazing systems. Consumers placed high importance on food safety, product origin, and traceability, reflecting increasing demand for quality-assured goat meat products. There were considerable market opportunities for the goat sector but also constrained related to small-scale production, fragmented marketing channels, weak value chain

coordination, and limited traceability systems. From an extension education perspective, market-oriented extension programmes should integrate technical husbandry training with market information, food safety standards, entrepreneurship development, and value chain strengthening. Improving farmer access to advisory services and strengthening producer–market linkages would enhance product quality, market responsiveness, long-term sustainability and competitiveness of goat production systems in Vietnam.

DECLARATIONS

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Ethical approval: This study was conducted in accordance with ethical standards. Informed consent was obtained from all respondents prior to data collection.

Data availability: The data used in this study are available from the corresponding author upon reasonable request.

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