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Communication exposure, knowledge and waste-management constraints among local implementing stakeholders in Gwalior district, Madhya Pradesh

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Abstract

Effective household waste management requires not only adequate waste-collection systems but also informed and capable local stakeholders who support awareness generation, implementation and community-level waste-management activities. However, evidence on the communication exposure, knowledge and constraints perceived by local implementing stakeholders remains limited. The present study was undertaken to assess communication exposure, knowledge regarding household waste management and waste-management constraints among local implementing stakeholders in Gwalior district of Madhya Pradesh. A descriptive study was conducted using data from 10 officials/public representatives associated with the local implementation of household waste-management activities. Data was collected through a pre-tested semi-structured interview schedule. Communication exposure was assessed using a three-point continuum of Always (3), Sometimes (2) and Never (1). Knowledge was assessed through questions related to household waste-management practices, waste classification and selected waste-management facts. Frequencies, percentages, mean, standard deviation and correlation analysis were used. Panchayat/Nagar Nigam publicity was the most frequently used information source, reported as "Always" by 60.00 per cent of stakeholders, followed by TV/Radio and Social Media (30.00% each). Among communication methods, wall painting recorded the highest mean exposure score (2.70), followed by door-to-door/face-to-face contact and advertisements on public vehicles (2.40 each). The overall communication-method exposure score was 29.00 ± 4.71 . Regarding knowledge, 70.00 per cent of stakeholders had a medium level, 20.00 per cent had a high level and 10.00 per cent had a low level, with a mean knowledge score of 37.30 ± 3.84 . Social participation showed the strongest positive association with knowledge ($r = 0.863$), followed by communication-method exposure ($r = 0.735$), information-source exposure ($r = 0.712$) and age ($r = 0.670$). The major observed constraints were irregular timing of waste collection and lack of knowledge about waste-management practices, each reported as "Always" by 80.00 per cent of stakeholders, followed by lack of awareness about waste management (70.00%). The findings suggest that local implementing stakeholders had predominantly medium knowledge and relied particularly on local-body publicity and visible communication channels. Strengthening stakeholder capacity, improving communication content and continuity, and addressing operational constraints in waste collection may support more effective household waste-management awareness and implementation.

Keywords: Communication exposure, household waste management, knowledge, local implementing stakeholders, constraints, Gwalior, Madhya Pradesh

1. Introduction

Household waste management involves the generation, storage, segregation, collection, transportation, treatment and final disposal of waste produced at the household level. Proper management of household waste is important for maintaining environmental quality, protecting public health and promoting sustainable community practices. Effective waste management also depends on household awareness, appropriate communication and the availability of supporting institutional systems.

In India, the Swachh Bharat Mission (SBM) has emphasised solid and liquid waste management at household and community levels and has promoted practices such as source

segregation, recycling and reduction of plastic waste through Information, Education and Communication (IEC) campaigns, training programmes and mass-awareness activities. Madhya Pradesh has adopted a cluster-based integrated solid waste-management approach involving Urban Local Bodies, although complete household-level segregation has not yet been achieved.

Communication is therefore an important component of household waste-management implementation. The thesis literature indicates that IEC activities need to be simple, locally contextualised, participatory and delivered through involvement of relevant stakeholders, while different communication methods may perform differently across

target groups. Studies reviewed in the thesis have reported the importance of interpersonal communication, print material, digital platforms, mass media and community-based interventions in improving awareness and waste-management practices.

However, effective implementation of household waste management does not depend solely on household awareness. Local officials and elected public representatives play an important role in communicating waste-management information, supporting awareness activities and addressing implementation-level problems. In the present study, a separate group of 10 officials and elected public representatives comprising 4 Nagar Nigam officials, 2 Sarpanch, 2 Upsarpanch and 2 Ward Members was interviewed to obtain the perspective of the implementing agency.

The thesis data provide information on the stakeholders' information-source use, social participation, communication-method exposure, waste-management knowledge and observed constraints. Among the information sources, Panchayat/Nagar Nigam publicity was reported as "Always" used by 60.00 per cent of the stakeholders, while TV/Radio and Social Media were each reported by 30.00 per cent. The separate stakeholder assessment also examined knowledge level and constraints, providing an institutional perspective that complements the household-level findings.

Despite the availability of communication channels and institutional programmes, implementation challenges remain. The thesis identifies irregular waste-collection timing, lack of knowledge about waste-management practices and lack of awareness as important constraints reported by officials and public representatives. Therefore, examining the communication exposure, knowledge and constraints of local implementing stakeholders can provide useful insights for strengthening locally appropriate household waste-management interventions in Gwalior district. Objectives of the Study

1. To assess the communication exposure of local implementing stakeholders regarding household waste management.
2. To assess the knowledge level of local implementing stakeholders regarding household waste-management practices.
3. To examine the relationship between selected profile variables, communication exposure and knowledge level

among local implementing stakeholders.

4. To identify the major waste-management constraints observed by local implementing stakeholders.

2. Materials and Methods

A descriptive research design was employed to assess communication exposure, knowledge and waste-management constraints among local implementing stakeholders in Gwalior district, Madhya Pradesh. The study was conducted during 2025–26 in purposively selected Gwalior district, considering its ongoing waste-management initiatives and implementation context.

A separate sample of 10 officials and elected public representatives associated with household waste-management implementation was included. The respondents comprised 4 Nagar Nigam officials, 2 Sarpanch, 2 Upsarpanch and 2 Ward Members. Data were collected personally using a pre-tested semi-structured interview schedule.

Communication exposure was assessed using a three-point continuum, assigning scores of 3 for Always, 2 for Sometimes and 1 for Never. Knowledge regarding household waste management was assessed through the prescribed knowledge items and respondents were classified into low, medium and high knowledge categories. The study also recorded constraints observed by the stakeholders in household waste-management implementation.

The collected data were analysed using frequency, percentage, mean, standard deviation and Pearson's correlation coefficient, as appropriate to the respective variables.

Since the stakeholder sample comprised only 10 respondents, the findings are interpreted as descriptive and exploratory evidence from local implementing stakeholders and are not intended to represent all implementing agencies in Gwalior district.

3. Results and Discussion

3.1 Communication Exposure among Local Implementing Stakeholders

The communication exposure of the 10 local implementing stakeholders was assessed across different information sources used for household waste-management awareness. The assessment considered the reported frequency of use of each source.

Table 1: Information Sources Used by Local Implementing Stakeholders for Household Waste-Management Awareness

S. No.	Information source	Always f (%)	Sometimes f (%)	Never f (%)
1	TV/Radio	3 (30.00)	5 (50.00)	2 (20.00)
2	Newspaper	1 (10.00)	4 (40.00)	5 (50.00)
3	Panchayat/Nagar Nigam publicity	6 (60.00)	3 (30.00)	1 (10.00)
4	Awareness programmes	2 (20.00)	5 (50.00)	3 (30.00)
5	Social Media	3 (30.00)	5 (50.00)	2 (20.00)
6	Other sources	1 (10.00)	3 (30.00)	6 (60.00)

The findings showed that Panchayat/Nagar Nigam publicity was the most frequently used information source, with 60.00 per cent of stakeholders reporting its use always. TV/Radio and Social Media were each reported as always used by 30.00 per cent of stakeholders. In contrast, newspaper use was reported as always by only 10.00 per cent, while 50.00 per cent reported never using it.

3.2 Communication-Method Exposure among Local Implementing Stakeholders:

The communication-method exposure of the 10 local implementing stakeholders was assessed across individual/group contact, mass media, audio, visual and audio-visual communication methods. The frequency of reported use was measured on a three-point continuum: Always (3), Sometimes (2) and Never (1).

Table 2: Communication-Method Exposure among Local Implementing Stakeholders (N=10)

S. No.	Communication method	Always f (%)	Sometimes f (%)	Never f (%)	Mean	Rank
A.	Individual/Group Contact					
1	Door-to-door/Face-to-face contact	5 (50.00)	4 (40.00)	1 (10.00)	2.40	II
2	Group meeting	4 (40.00)	4 (40.00)	2 (20.00)	2.20	IV
3	WhatsApp/Message	2 (20.00)	5 (50.00)	3 (30.00)	1.90	IX
4	Demonstration	1 (10.00)	3 (30.00)	6 (60.00)	1.50	XVI
B.	Mass Media					
5	Internet/Website Articles	4 (40.00)	4 (40.00)	2 (20.00)	2.20	IV
6	Newspaper	4 (40.00)	3 (30.00)	3 (30.00)	2.10	VIII
7	Magazine	0 (0.00)	0 (0.00)	10 (100.00)	1.00	XVII
C.	Audio Message					
8	Radio Broadcast	0 (0.00)	3 (30.00)	7 (70.00)	1.30	XV
9	Digital Audio	0 (0.00)	0 (0.00)	10 (100.00)	1.00	XVII
10	Audio Podcast	0 (0.00)	3 (30.00)	7 (70.00)	1.30	XV
D.	Visual Message					
11	Poster	4 (40.00)	4 (40.00)	2 (20.00)	2.20	IV
12	Chart	2 (20.00)	2 (20.00)	6 (60.00)	1.60	XIII
13	Pamphlet	3 (30.00)	2 (20.00)	5 (50.00)	1.80	XI
14	Wall Painting	7 (70.00)	3 (30.00)	0 (0.00)	2.70	I
15	Advertisement on Public Vehicle	6 (60.00)	2 (20.00)	2 (20.00)	2.40	II
E.	Audio-Visual Message					
16	Television	3 (30.00)	6 (60.00)	1 (10.00)	2.20	IV
17	Social Media	2 (20.00)	5 (50.00)	3 (30.00)	1.90	IX
18	Recorded Video Tape	1 (10.00)	4 (40.00)	5 (50.00)	1.60	XIII

Overall communication-method exposure score: Mean = 29.00; SD = 4.71.

The findings revealed that wall painting was the most frequently used communication method, with 70.00 per cent of stakeholders reporting its use always and a mean score of 2.70, followed by door-to-door/face-to-face contact and advertisement on public vehicles, each with a mean score of 2.40.

Among individual/group contact methods, door-to-door/face-to-face contact was the most frequently used, while demonstration was comparatively less used. Among mass-media sources, Internet/Website Articles and newspapers were more frequently used than magazines.

Among visual communication methods, wall painting and advertisements on public vehicles were prominent, whereas chart use was comparatively limited. For audio-visual methods, television recorded the highest mean score (2.20),

while recorded video tape had a lower score (1.60).

Overall, the findings suggest that stakeholders relied more on visible and direct communication approaches, particularly wall paintings, face-to-face contact and public-vehicle advertisements, than on less frequently used channels such as magazines, digital audio and audio podcasts.

3.3 Knowledge Level of Local Implementing Stakeholders Regarding Household Waste Management

The knowledge level of the 10 local implementing stakeholders regarding household waste management was assessed using the prescribed knowledge scale. Respondents were classified into low, medium and high knowledge categories according to their knowledge scores.

Table 3: Distribution of Local Implementing Stakeholders According to Knowledge Level Regarding Household Waste Management

S. No.	Knowledge category	Officials/Representatives (N=10) f (%)
1	Low (up to 33)	1 (10.00%)
2	Medium (34–41)	7 (70.00%)
3	High (More than 41)	2 (20.00%)
	Total	10 (100.00%)
	Mean $\pm$ SD	37.30 $\pm$ 3.84

The findings revealed that the majority of local implementing stakeholders (70.00%) possessed a medium level of knowledge regarding household waste management, followed by 20.00 per cent with a high level of knowledge. Only 10.00 per cent of respondents belonged to the low-knowledge category. The mean knowledge score was 37.30 $\pm$ 3.84, indicating an overall moderate level of knowledge among the stakeholders.

These findings suggest that although most implementing stakeholders possessed a satisfactory base of knowledge regarding household waste management, there remains scope for strengthening technical and practical knowledge, particularly among stakeholders falling within the low and

medium categories. Capacity-building programmes can therefore focus on improving knowledge related to waste segregation, processing, recycling and other operational aspects of household waste management.

3.4 Relationship of Selected Variables with Knowledge Level among Local Implementing Stakeholders

The relationship between selected profile and communication-related variables and knowledge level regarding household waste management was examined using Pearson's correlation coefficient (r). The analysis was conducted among the 10 local implementing stakeholders.

Table 4: Correlation between Selected Variables and Knowledge Level of Local Implementing Stakeholders (N=10)

S. No.	Variable	Correlation coefficient (r)
1	Age	0.670*
2	Education	0.295 NS
3	Gender	0.265 NS
4	Occupation	-0.209 NS
5	Family Size	-0.329 NS
6	Annual Income	0.645*
7	Information Source Exposure	0.712*
8	Social Participation	0.863**
9	Communication Methods Exposure	0.735*

Note: ** Significant at 0.01 level of probability; * significant at 0.05 level of probability; NS = non-significant.

The findings revealed that social participation had the strongest positive and highly significant relationship with knowledge level ($r = 0.863^{**}$). Communication-method

exposure also showed a positive and significant relationship with knowledge ($r = 0.735^{*}$), followed by information-source exposure ($r = 0.712^{*}$). Age ($r = 0.670^{*}$) and annual income ($r = 0.645^{*}$) also showed positive and significant associations with knowledge.

Education ($r = 0.295$) and gender ($r = 0.265$) showed positive but non-significant relationships. Occupation ($r = -0.209$) and family size ($r = -0.329$) showed negative but non-significant relationships with knowledge level.

3.5 Waste-Management Constraints Observed by Local Implementing Stakeholders

The major constraints observed by the 10 local implementing stakeholders in household waste management were assessed based on their reported frequency of occurrence. The constraints were recorded on a three-point scale of Always, Sometimes and Never.

Table 5: Constraints Faced/Observed by Local Implementing Stakeholders in Household Waste Management (N=10)

S. No.	Constraint	Always f (%)	Sometimes f (%)	Never f (%)
1	Lack of knowledge about waste segregation (wet/dry)	3 (30.00)	6 (60.00)	1 (10.00)
2	Non-availability of separate dustbins	5 (50.00)	5 (50.00)	0 (0.00)
3	Non-availability of waste-collection vehicle/service	4 (40.00)	3 (30.00)	3 (30.00)
4	Lack of cooperation from neighbours	0 (0.00)	2 (20.00)	8 (80.00)
5	Inadequate infrastructure of local body/municipality	6 (60.00)	3 (30.00)	1 (10.00)
6	Lack of awareness about waste management	7 (70.00)	3 (30.00)	0 (0.00)
7	Irregular timing of waste-collection vehicle	8 (80.00)	2 (20.00)	0 (0.00)
8	Lack of knowledge about waste-management practices	8 (80.00)	2 (20.00)	0 (0.00)

The findings revealed that irregular timing of the waste-collection vehicle and lack of knowledge about waste-management practices were the most frequently reported constraints, with each being reported as “Always” by 80.00 per cent of the stakeholders. This was followed by lack of awareness about waste management (70.00%) and inadequate infrastructure of the local body/municipality (60.00%).

The non-availability of separate dustbins was reported as an “Always” constraint by 50.00 per cent and as a “Sometimes” constraint by another 50.00 per cent of stakeholders. Similarly, non-availability of waste-collection vehicle/service was reported as “Always” by 40.00 per cent, “Sometimes” by 30.00 per cent and “Never” by 30.00 per cent.

In contrast, lack of cooperation from neighbours was the least frequently observed constraint, with 80.00 per cent of stakeholders reporting that they never faced this issue.

Overall, the stakeholder responses point particularly towards irregular waste-collection services and gaps in waste-management knowledge and awareness as important implementation-level concerns. These findings support the need for more reliable collection schedules and continued capacity-building and awareness activities among households.

4. Conclusion

The study assessed communication exposure, knowledge and waste-management constraints among 10 local implementing stakeholders in Gwalior district, Madhya Pradesh. The findings showed that Panchayat/Nagar Nigam publicity was the most frequently used information source, while wall

painting, door-to-door/face-to-face contact and advertisements on public vehicles were among the prominent communication methods. The overall communication-method exposure score was 29.00 ± 4.71 .

Regarding knowledge, the majority of stakeholders (70.00%) possessed a medium level of knowledge, followed by 20.00 per cent with a high level and 10.00 per cent with a low level. The mean knowledge score was 37.30 ± 3.84 .

Social participation showed the strongest positive association with knowledge ($r = 0.863$), followed by communication-method exposure ($r = 0.735$), information-source exposure ($r = 0.712$), age ($r = 0.670$) and annual income ($r = 0.645$). These findings suggest that greater participation and exposure to communication channels were associated with higher knowledge among the stakeholders.

The major constraints observed were irregular timing of the waste-collection vehicle and lack of knowledge about waste-management practices, each reported as “Always” by 80.00 per cent of stakeholders. Lack of awareness about waste management was another important constraint, reported as “Always” by 70.00 per cent.

Overall, the findings highlight the importance of strengthening communication-based awareness activities, improving stakeholder knowledge and ensuring reliable waste-collection services. Since the study was based on only 10 implementing stakeholders, the findings should be interpreted as descriptive and exploratory evidence rather than generalisable estimates.

5. Recommendations / Practical Implications

1. Strengthen local-body communication: Panchayat and Nagar Nigam publicity should be continued and

strengthened as an important channel for household waste-management awareness.

2. Prioritise visible and direct methods: Wall paintings, door-to-door/face-to-face communication and advertisements on public vehicles should be regularly used because these were among the more frequently exposed communication methods among stakeholders.
3. Strengthen technical knowledge: Capacity-building programmes should focus on practical aspects of household waste management, particularly source segregation, recycling, reuse and proper handling of different waste types.
4. Improve collection services: Reliable and timely waste collection should be ensured, as irregular timing of waste-collection vehicles was one of the most frequently observed constraints.
5. Improve awareness and IEC content: Continued awareness activities should address the identified knowledge and awareness gaps rather than relying only on increasing the frequency of communication.

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