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Municipal Solid Waste Exposure And Respiratory Health Of Garbage Collectors

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Abstract:
Garbage collectors face significant health risks due to prolonged exposure to municipal solid waste (MSW), potentially containing hazardous chemicals and pollutants. Despite projected increases in waste generation, research on respiratory health outcomes remains scarce. As such, this study aimed to evaluate the respiratory health of 71 garbage collectors from City Environment and Natural Resources Office-Las Piñas (CENRO-LP). The Saint George Respiratory Questionnaire (SGRQ) assessed symptoms, activity limitations, psychosocial impacts, and overall health outcomes, which were compared to baseline data from individuals without respiratory conditions. Statistical analysis included frequency and percentage distributions for demographic and health profiles, with Analysis of Variance (ANOVA) identifying significant differences based on demographic factors. Ethical considerations were ensured by obtaining informed consent, maintaining confidentiality, and ensuring a right to withdraw. Findings revealed that 62% (44) of respondents experienced high levels of respiratory symptoms, and 54% (38) reported significant activity limitations. In contrast, 34% (24) reported high psychosocial impacts. Overall, 44% (31) of respondents had high total scores, indicating more significant respiratory health issues. Age did not significantly affect the results ($p > 0.05$); however, length of employment was a significant factor, with workers employed for over 10 years showing worse respiratory health outcomes ($p < 0.05$). Based on these findings, the study recommends the implementation of long-term intervention programs, including "ALAGA SA KALUSUGAN AT AKSYON SA PAGHINGA NG PALERO" for long-term garbage collectors, "PROTEKTADONG PAGHINGA: KALUSUGAN AT KALIGTASAN NG PALERO" seminar on MSW exposure, and the "ALAGA'T GINHAWA: ANG KARAVAN NG KALUSUGAN" free health caravan for providing accessible healthcare and education to improve respiratory health of garbage collectors and raise awareness of MSW-related risks.
Keywords:*Garbage Collectors, Municipal Solid Waste, Occupational Health, Respiratory Health, Waste Collection*

INTRODUCTION:

Garbage collectors are essential frontline workers who play a pivotal role in ensuring public health and sanitation. However, they are among one of the most vulnerable sectors of the population as their nature of work often involves direct exposure and management of Municipal Solid Waste (MSW) or the unwanted solid waste materials garnered from households and municipal services [1].

Although various health problems are associated with MSW management and processing, exposure to various air pollutants and toxic compounds poses a unique set of challenges to the respiratory health of these workers. According to Papageorgiou et al. (2021), frequent and repeated inhalation of dust, fumes, and bioaerosols during the strenuous tasks of waste collection, raises the risk of developing and/or exacerbating respiratory illnesses such as chronic obstructive pulmonary disease (COPD), asthma, and hypersensitivity pneumonitis. Other commonly documented respiratory problems also include symptoms affecting both the upper respiratory tract (e.g., sneezing, sore throat) and lower respiratory tract (e.g., wheezing, shortness of breath), with many workers also demonstrating a restrictive lung function pattern and declining forced expiratory volume over time [2].

The COVID-19 pandemic has exacerbated these challenges leading to radical shifts in the volume and complexity of waste handled by garbage collectors [3]. According to Roy et al. (2021), medical waste generated from hospitals and households is projected to continue rising through 2025, even in the post-pandemic period. However, the absence of clear policies and guidelines for waste management and treatment has left workers repeatedly encountering potentially infectious items, such as face masks, gloves, and other contaminated medical waste, alongside general MSW [4].

With global waste generation expected to rise by 70%—from 2.01 billion tons in 2016 to 3.4 billion tons by 2050—current waste management systems are anticipated to face significant challenge [5]. Despite this, limited research addresses the occupational health risks experienced by garbage collectors [6]. Such is most evident in developing countries like the Philippines, where inadequate regulatory governance and insufficient resources and infrastructure hinder effective waste management and worker protection [7].

Therefore, this study aims to address the research gap by employing a quantitative approach to systematically assess the respiratory health outcomes of garbage collectors. The primary objectives are to evaluate the prevalence and severity of respiratory conditions among these workers using the Saint George's Respiratory Questionnaire (SGRQ) and to compare their respiratory health with baseline data from individuals without respiratory diseases. By examining factors such as age and length of employment, this study will also provide insights into the long-term effects of MSW exposure on respiratory health among waste workers.

As such, this research is significant for several reasons. For garbage collectors, it provides critical insights into how MSW exposure affects their respiratory health, empowering them to advocate for better protective practices and workplace safety measures. It also raises awareness of their situation and sparks discussions on occupational safety and hazards. For policy makers, this research study offers actionable insights to guide the creation of robust health and safety protocols tailored to the current Philippines setting. This study is also significant for healthcare professionals and public health organizations, as it can guide interventions and health monitoring programs to help prevent and mitigate respiratory conditions in this workforce. Finally, this study is beneficial for the general public as it highlights the dangers faced by garbage collectors, which can increase awareness and appreciation for this workforce and enable them to promote safer waste management practices at home.

2) METHODS AND METHODOLOGY:

Research Design

This study utilized a Quantitative Descriptive Research Design to explore the impact of Municipal Solid Waste (MSW) exposure on the respiratory health of garbage collectors in Las Piñas City. Specifically, a modified and translated version of the St. George's Respiratory Questionnaire (SGRQ) was used to assess respiratory health across three domains: Symptoms, Activity, and Impact, enabling an objective analysis of health outcomes and related variables. Frequency and percentage distributions were used to describe demographic characteristics (age and length of employment) and to compare results with baseline data from individuals without respiratory disease. To assess whether significant differences in respiratory outcomes existed across demographic groups, Analysis of Variance (ANOVA) was applied.

Sampling and Participants

This study utilized a Purposive Sampling method to ensure participant relevance to the research objectives. Inclusion was limited only to full-time "Compactor Truck Paleros" under the City Environment and Natural Resources Office (CENRO) of Las Piñas who were directly involved in the manual collection and sorting of municipal solid waste (MSW). From the 142 individuals under the CENRO payroll, only 102 met this criterion. Thus, the remaining 40 non-collection staff, such as drivers and street sweepers, were excluded.

Participants were also required to have at least 3 months of continuous, active employment as garbage collectors under CENRO Las Piñas prior to the data collection period to ensure consistent MSW exposure and to uphold the validity of the study in line with instrumentation guidelines. Thus, 2 individuals were excluded for not meeting this requirement.

To maintain ethical standards, only garbage collectors aged 17 to 80 who were present during the data collection period on October 28, 2024 (6:00 AM to 6:00 PM) and who voluntarily provided informed consent were included. Of the 100 eligible individuals, 27 declined to participate and 2 were absent, resulting in a final sample of 71 respondents.

Instrumentation

This study utilized a translated and modified version of the St. George's Respiratory Questionnaire (SGRQ), originally developed by Jones et al. (1991) at St. George's University of London. The SGRQ is a validated tool designed to measure health-related quality of life in individuals with respiratory diseases and has been widely adapted for use in diverse populations.

The instrument demonstrates strong psychometric properties, including internal consistency (Cronbach's alpha > 0.70 across components) and high test-retest reliability (intraclass correlation: 0.795–0.900). Its

validity is supported by significant correlations with both subjective respiratory symptoms and objective respiratory function measures [8].

For this study, the questionnaire was divided into 3 sections:

Firstly, the first section determined the demographic profile of the participants, including the age and length of employment. This is vital in characterizing the sample population and identifying variables that may influence the outcome and validity of the study.

Next, the second section utilized the St. George's Respiratory Survey Questionnaire (SGRQ) questions to determine the association between MSW exposure and respiratory health outcomes. Respondents indicated applicable statements by placing a checkmark (✓), with each item assigned a specific weight based on the March 2020 SGRQ Manual, thereby enabling quantitative analysis of their respiratory health.

In this case, respiratory health was measured based on the three (3) SGRQ components:

Firstly, the SYMPTOMS component. This focused on the presence, frequency, and severity of respiratory symptoms such as coughing, sputum production, and wheezing. Scores were derived from the summed weights of positive responses to Questions 1–8.

Next, the ACTIVITY component. This measured the degree to which respiratory symptoms limited physical activity, including walking or engaging in strenuous tasks. It quantifies how breathlessness affects the participants' daily activities, with scores based on the summed weights of positive responses to questions 11 and 15.

Next, the IMPACT component. This evaluated the broader effects of respiratory issues on emotional well-being, daily functioning, and social interactions. This component included Questions 9–10, 12–14, and 16–17.

Finally, the TOTAL score is calculated by summing the weighted scores from all three components. This total score ranges from 0 to 100, with higher scores indicating worse respiratory health outcomes. In general, higher scores reflect more severe symptoms, greater activity limitations, and a more significant negative impact on quality of life.

Data Gathering Procedure

To gather the information used for the study, the following steps were undertaken:

First, the researchers coordinated with the City Environment and Natural Resources Office (CENRO) in Las Piñas City. To obtain a master list of full-time garbage collectors employed as "Compact Truck Paleros". With the necessary documentation and permission, eligible participants were identified and purposive sampling methods were used to select participants based on specified inclusion criteria.

Next, the survey collection period was scheduled on October 28, 2024, from 6:00 AM to 6:00 PM. With help from CENRO personnel, a designated data collection station was set up to accommodate participants. Garbage collectors were given the option to participate either before or after completing their collection routes, based on their convenience and availability.

Next, the selected participants were randomly assigned to a researcher for survey administration. Prior to the survey, participants underwent a comprehensive briefing to ensure they fully understood the study's objectives, procedures, risks, and benefits. They were also required to sign an informed consent form to confirm their understanding and voluntary participation. To maintain proper documentation, participants were asked to present their ID card. If unavailable, a photo was taken of them either signing or holding the consent form.

Next, participants were instructed on how to properly complete the questionnaire. The survey questionnaire was then distributed and administered to each of the selected participants. Researchers facilitated the process by providing clarifications and addressing inquiries as needed. For participants with physical limitations, such as poor eyesight, assistance was provided by reading the questions aloud and accurately documenting their responses.

After answering the survey, surveys were collected, reviewed, and prepared for analysis. Participants were then debriefed on the study's purpose and outcomes. Throughout the process, quality control and validation measures were applied to ensure data accuracy and reliability.

Data Analysis

This study employs quantitative analysis to assess the impact of Municipal Solid Waste (MSW) exposure on the respiratory health of garbage collectors in Las Piñas City.

In response to the research question, "What is the demographic profile of the respondents?" frequency and percentage distribution methods were used to describe key characteristics such as age and length of employment. Thus, the following formula was used:

PERCENTAGE (%)

$$\% = \frac{F}{N} \text{ x } 100$$

Where: F = Frequency | N = Number of Respondents

In response to the research question, "How does the respiratory health of the respondents compare to baseline data of people with no respiratory diseases (See Appendix A)?", the following formulas were used:
To calculate the component scores (SYMPTOMS / ACTIVITY / IMPACT):

COMPONENT SCORE (CS)

$$\mathbf{CS} = \frac{\text{Total Weights of Positive Responses in the Component}}{\text{Total Weights for All Items in the Component}} \text{ x } 100$$

To calculate the TOTAL or overall impact on respiratory health:

TOTAL SCORE (TS)

$$\mathbf{TS} = \frac{\text{Total Weights of All Positive Responses in the Questionnaire}}{\text{Total Weights for All Items in the Component}} \text{ x } 100$$

To compare the results with the baseline data, the following formula was used:

PERCENTAGE (%)

$$\% = \frac{F}{N} \text{ x } 100$$

Where: F = Frequency | N = Number of Respondents
For each of the components and the total score, the following interpretation (see Table 1) was used to compare the results with the baseline data of respondents (see Appendix A):

Table 1: Table 1, SGRQ Category Score Ranges and Interpretations
Table 1. SGRQ Category Score Ranges and Interpretations

CATEGORY	SCORE RANGE	INTERPRETATION
SYMPTOMS	> 15	HIGH
	9 - 15	MID
	< 9	LOW
ACTIVITY	> 12	HIGH
	< 7	MID
	7 -12	LOW
IMPACT	> 3	HIGH
	1 - 3	MID
	< 1	LOW

TOTAL	< 6	HIGH
	6 - 7	MID
	>7	LOW

Table 1 presents the scoring ranges and corresponding interpretations for the Saint George's Respiratory Questionnaire (SGRQ). Each category—Symptoms, Activity, Impact, and Total—has defined cut-off points that classify results into low, mid, or high levels, indicating the severity of respiratory health outcomes among respondents.

To address the research questions, "*Is there a statistically significant difference in the responses when grouped according to the demographic profile?*" and "*Is there a statistically significant difference in the overall respiratory health of garbage collectors with varying levels of MSW exposure?*", the Analysis of Variance (ANOVA) test was applied. This test was used to allow for the comparison of means between multiple groups to help determine whether the differences are statistically significant. As such, the following formulas were used:

ANALYSIS OF VARIANCE (ANOVA) TEST

Source of Variation	**Sum of Squares**	**Degrees of Freedom**	**Mean Squares**	**F-Value**
Between Groups	**SSB =** $n_j (x_j - x)^2$	$df_1 = k - 1$	MSB = SSB / (k - 1)	f = MSB / MSE
Error	**SSE =** $(x - x_j)^2$	$df_2 = N - k$	MSE = SSE / (N - k)	
Total	SST = SSB + SSE	$df_3 = N - 1$		

Where: SSB = Sum of squares between groups | SSE = Sum of squares of errors | ∑ = Sum of the set of numbers | Xj - X¯ = Mean of the jth group | X- Xj = Overall mean | nj = Sample size of the jth group | X = Each data point in the jth group (individual observation) | N = Total number of observations/total sample size | SST = Total sum of squares | df = Degrees of Freedom | k = number of groups | N = total number of observations | f = F-Value | MSB = Mean Squares between groups | MSE = Mean Squares between Error

Ethical Considerations

Several ethical principles were upheld to protect participant welfare and rights. All participants received clear information about the study's objectives, procedures, risks, and benefits, with accommodations made for potential language barriers. Written informed consent was also obtained prior to participation. Next, participants were explicitly informed of their involvement's voluntary nature and were free to withdraw from the study at any stage. Strict confidentiality measures, including anonymization, were also implemented to protect participant's identities.

Next, the principles of fairness, beneficence, and non-maleficence guided practices to maximize benefits and minimize potential harm. Special consideration was undertaken to limit potential biases in recruitment, data collection, and analysis to ensure unbiased representation.

Lastly, all participants received a thorough debriefing, to provide insights into the study's outcomes and address any questions or concerns. Continuous ethical oversight was maintained throughout to uphold the highest standards of ethical conduct throughout the research endeavour.

3) RESULTS:

Table 2 - 3: In response to the research problem #1, "What is the demographic profile of the respondents?", in terms of Age and Length of Employment:

Table 2: Table 2, Demographic Profile of Respondents According to Age

Table 2. Demographic Profile of Respondents According to Age

AGE GROUP (YEARS)	FREQUENCY	PERCENTAGE

17 - 19	2	3%
20 - 29	14	20%
30 - 39	15	21%
40 - 49	15	21%
50 - 59	18	25%
60 - 69	7	10%
TOTAL	**71**	**100%**

Table 2 presents the age distribution of the 71 respondents or 100% of the sample. The largest group falls within the 50–59 age range with 18 respondents (25%), followed by the 30–39 and 40–49 groups with 15 respondents each (21%), and the 20–29 group with 14 respondents (20%). The 60–69 age group comprises 7 respondents (10%), while the smallest group, aged 17–19 with only 2 respondents represents only 3% of the sample.

Although age is often considered a potential risk factor for respiratory health, previous studies suggest it may not significantly affect respiratory outcomes among waste workers. This aligns with studies of Salvaraji et al. (2020), which found no association between age and respiratory symptoms in waste workers, and Tlotleng et al. (2019) [9] [10], who found that socio-demographic factors like age had no significant correlations with respiratory symptoms.

Table 3: Table 3, Demographic Profile of Respondents According to Length of Employment
Table 3. Demographic Profile of Respondents According to Length of Employment

LENGTH OF EMPLOYMENT	FREQUENCY	PERCENTAGE
Mas mababa sa 1 taon	8	11%
1 - 5	21	30%
6 - 10	14	20%
Higit sa 10 taon	28	39%
TOTAL	**71**	**100%**

Table 3 presents the demographic profile of the 71 respondents (100%) based on length of employment. A majority fall under the "Higit sa 10 taon" (>10 years of employment) category, with 28 respondents (39%). This was followed by 21 respondents (30%) with 1-5 years, 14 respondents (20%) with 6-10 years, and 8 respondents (11%) with "Mas mababa sa 1 taon" (< 1 year) of service.

Length of employment has been identified as a key factor affecting respiratory health among waste collectors. Madsen et al. (2021) [11], citing Schantora et al., found that the odds of chronic cough and bronchitis increase with every decade of exposure (OR 1.64 and 2.18, respectively). Similarly, Abou-ElWafa et al. reported significantly reduced FVC% and FEV1% in workers with over 15 years of exposure, likely due to prolonged exposure and inhalation of contaminants during waste collection activities [2].

Table 4: In response to the research problem #2, "What is the level of respiratory health in the respondents compared to baseline data of individuals without respiratory diseases based on their SGRQ results (See Appendix A)", in terms of Symptoms, Activity, Impact, and overall Total:

Table 4: Table 4, Respiratory Health of Respondents Compared to Baseline Data of People with No History of Respiratory Diseases

Table 4. Respiratory Health of Respondents Compared to Baseline Data of People with No History of Respiratory Diseases

	SYMPTOMS		*ACTIVITY*		*IMPACT*		*TOTAL*	
	F	%	**F**	%	**F**	%	**F**	%

LOW	7	10%	28	39%	36	51%	24	34%
MID	20	28%	5	7%	11	15%	16	23%
HIGH	44	62%	38	54%	24	34%	31	44%
TOTAL	**71**	**100%**	**71**	**100%**	**71**	**100%**	**71**	**100%**

Table 4 presents the respiratory health of the 71 respondents compared to baseline data of individuals with no history of respiratory diseases.

In terms of SYMPTOMS, the majority of respondents fall under HIGH amounting to 44 respondents (62%). This is followed by 20 respondents (28%) under the MID, and 7 (10%) under the LOW category. For ACTIVITY, the majority of respondents also fall under the HIGH category, with 38 respondents (54%). This is followed by 28 respondents or 39%, in the LOW category and the MID category with 5 respondents of 7%. For IMPACT, 24 respondents (34%) are in the HIGH category, 11 (15%) in MID, and 36 (51%) in LOW. Under the TOTAL score, 31 respondents (44%) fall under HIGH, 16 (23%) under MID, and 24 (34%) under LOW.

Numerous studies confirm a strong link between exposure to waste management activities and adverse respiratory health outcomes. Prolonged exposure to environmental hazards in waste collection is associated with a high prevalence of symptoms such as coughing, sneezing, wheezing, and shortness of breath [4] [9]. These exposures may also contribute to declining lung function and the onset or worsening of chronic respiratory conditions such as asthma and chronic obstructive pulmonary disease (COPD). Moreover, respiratory impairments can result in significant social and psychological impacts, including reduced self-esteem, anxiety, and depression [12].

In the Philippines, a study by Oracion et al. (2018) on waste workers of CENRO Bayawan revealed that 75% of directly-exposed waste workers who admitted to being sick within the year experienced respiratory ailments that may be associated with exposure to pollution, toxic substances, and foul odors. As a result, this has led to absences and missed work [13].

Table 5 - 6: In response to the research problem #3, "Is there a significant difference in the level of SGRQ results of the respondents when grouped according to age and length of employment?"

Table 5: Table 5, *Significant Difference in SGRQ Results of Respondents by Age Group*

Table 5. Significant Difference in SGRQ Results of Respondents by Age Group

Source of Variation	**SS**	**df**	**MS**	**F**	**P-value**	**F crit**
Between Groups	284.4264	3	94.80881	1.3998	0.2792	3.2388
Within Groups	1083.623	16	67.72642			
Total	**1368.049**	**19**				

Table 5 presents the significant difference between SGRQ results of respondents when grouped according to age. The computed F value of 1.3998, with an alpha value of 0.05, is less than the p-value of 0.2792 with the critical F value of 3.2388. Thus, the null hypothesis cannot be rejected, indicating no significant difference in respiratory health outcomes based on age.

This finding aligns with Salvaraji et al. (2020), who reported no association between respiratory symptoms and age among Malaysian waste workers [9]. Similarly, Tlotleng et al. (2019) found no significant link between socio-demographic factors, including age and sex, and respiratory symptoms in landfill workers [10]. Both studies suggest that factors such as airborne dust exposure, chronic health conditions, and smoking have a greater influence on respiratory health than age in populations exposed to municipal solid waste.

Table 6: Table 6, *Significant Difference in SGRQ Results of Respondents by Length Of Employment*

Table 6. Significant Difference in SGRQ Results of Respondents by Length Of Employment

Source of Variation	**SS**	**df**	**MS**	**F**	**P-value**	**F crit**
Between Groups	232.2496	3	77.41652	5.1304	0.0163	3.4902
Within Groups	181.0754	12	15.08962			

Total	**413.325**	**15**				

Table 6 presents the significant difference between the SGRQ results of the respondents when grouped according to length of employment.

The computed F value of 5.1304, with an alpha value of 0.05, is greater than the p-value of 0.0163 and the critical F value of 3.4902. Thus, the null hypothesis is rejected, indicating a significant difference in SGRQ results of the respondents based on their length of employment.

Similar findings have been observed in other studies, which have shown that longer exposure to occupational hazards, such as dust, bioaerosols, and exhaust fumes, increases the likelihood of respiratory issues among workers. This risk is further compounded by the physical exertion involved in waste collection, which increases ventilation rates and subsequently the inhalation of harmful particles (Papageorgiou et al, 2021)

As cited by Madsen et al. (2021), Schantora et al.'s cross-sectional study on 69 male waste collectors demonstrated a significant association between prolonged employment in waste collection and respiratory issues. Specifically, each additional 10 years in waste collection was linked to a higher likelihood of chronic cough (OR = 1.64) and chronic bronchitis (OR = 2.18) [11].

Furthermore, Madsen et al. (2021) cites Abou-ElWafa et al.'s study of 198 solid waste collectors, which revealed that workers with over 15 years of employment had significantly lower Forced Vital Capacity (FVC%) and Forced Expiratory Volume in 1 second (FEV1%) compared to those with shorter employment. These findings suggest that extended exposure to waste contributes to progressive lung function decline over time [11].

Table 7-8: In response to the research problem #4, "Based on the results, what is the intervention program that can be developed to promote respiratory health among garbage collectors?"

Table 7: Table 7, *Proposed Program #1 - Alaga sa Kalusugan at Aksyon sa Paghinga ng Palero (AKAP - PALERO)*

Table 7. Proposed Program #1 - Alaga sa Kalusugan at Aksyon sa Paghinga ng Palero (AKAP - PALERO) **PROGRAM TITLE: ALAGA SA KALUSUGAN AT AKSYON SA PAGHINGA NG PALERO (AKAP-PALERO)**	
PROGRAM OBJECTIVE(S):	
General Objective:	To improve the respiratory health and well-being of CENRO garbage collectors by providing targeted interventions and support.

Specific Objective(s):	- To raise awareness about respiratory health among garbage collectors by 30% within 6 months, as measured by pre- and post-program surveys assessing knowledge of respiratory symptoms, prevention, and available resources. - To increase engagement in the AKAP-PALERO health program by 50% within 6 months, encouraging more long-term garbage collectors to participate in proposed intervention programs. - To increase participation of employees in regular respiratory health screenings by 25% within 6 months. - To enhance access to respiratory health resources by 30% within 6 months, ensuring that at least 90% of long-term garbage collectors can easily access these resources. - To reduce the prevalence of respiratory symptoms (as measured by the SGRQ Symptoms component) by at least 12% among garbage collectors within 12 months of program implementation. - To reduce the reported activity limitations (as measured by the SGRQ Activity component) by at least 20% among garbage collectors within 12 months of program implementation. - To reduce the reported impacts of respiratory symptoms on the workers' quality of life (as measured by the SGRQ Impact component) by at least 10% among garbage collectors within 12 months of program implementation. - To reduce the overall total score (as measured by the SGRQ Total component) by at least 15% among long-term garbage collectors within 12 months of program implementation.
RATIONALE:	Exposure to hazardous materials in municipal solid waste (MSW) puts garbage collectors at significant risk for respiratory issues. Despite access to free healthcare, many are unaware of the specific health risks they face or lack engagement with preventive care. The AKAP-MP program addresses these challenges by raising awareness, improving access to health resources, and increasing participation in respiratory health initiatives. The goal is to reduce respiratory symptoms, improve quality of life, and ensure that long-term garbage collectors are actively engaged in maintaining their health and well-being
RESOURCES:	
TARGET POPULATION:	All garbage collectors employed under the City Environment and Natural Resources Office - Las Pinas (CENRO-LP)
VENUE/S:	City Environment and Natural Resources Office - Las Pinas (CENRO-LP) OFFICE Las Pinas City Dump Site under City Environment and Natural Resources Office - Las Pinas (CENRO-LP)
FUNDING SOURCE(S):	Government Health and Welfare Funds, Grants and Donations from Non-Governmental Organizations, and Crowdfunding and Community Donations

The following table provides a comprehensive overview of the proposed "ALAGA SA KALUSUGAN AT AKSYON SA PAGHINGA NG PALERO (AKAP-PALERO)" program. This framework serves as a guide for understanding the program's purpose, target audience, and resources needed to ensure its effectiveness in addressing the respiratory health of garbage collectors.

Table 8: Table 8, *Timeline of Activities for Proposed Program # 1 - Phase 1: Planning*
Table 8. Timeline of Activities for Proposed Program # 1 - Phase 1: Planning

PHASE 1: PLANNING							
PROPOSED TIME FRAME	**DURATION**	**ACTIVITIES**	**PERSONS RESPONSIBLE**	**PROPOSED BUDGET**	**VENUE**	**RESOURCES**	**EXPECTED OUTCOMES**
MONTH 1 MARCH 2024	1 MONTH	Schedule Meeting with LP-Mayor and CENRO-Officials to discuss findings and proposed plans.	- Researchers - LP Mayor - CENRO - LP officials - Municipal Health Officer - Stakeholders and organizations	₱ 500	- CENRO - LP Office - Virtual Meetings	- Meeting Agenda - Approval Documents - Approved Research Study -Employee Masterlist	- To ensure key stakeholders are informed and aligned with the program goals. - To receive approval to proceed with the program.
		Secure approval from Mayor's Office and CENRO-LP officials	- Researchers - LP Mayor - CENRO officials	₱ 500	- CENRO - LP Office - Virtual Meetings	- Approval Documents - Supporting Documents	- To obtain formal authorization to implement the program. - To ensure program legitimacy, access to resources and receive support from local authorities.
		Coordinate with CENRO-LP to identify garbage collectors	- Researchers - CENRO officials	₱ 0	- CENRO - LP Office	- Employee Masterlist	- To identify target participants.

		Perform an ocular inspection of the site to assess working conditions and health risks.	- Researchers - CENRO-LP officials	₱ 500	- Las Pinas Dump Site	- Health Risk Assessment Tools	- To generate a comprehensive report on working conditions and associated health risks.
		Develop appropriate program materials and surveys	- Researchers - Validators	₱ 3,000	- CENRO -LP Office	- Educational Materials - Survey Forms	- To generate program materials and surveys tailored to participants' needs.
MONTH 2 APRIL 2024	1 MONTH	Conduct survey to establish baseline data on participants' health conditions	- Researchers - Validators	₱ 1,500	- Las Pinas Dump Site	- Survey Forms	- To generate baseline data for evaluating respiratory health risks.
		Analyze survey results and finalize program intervention plan	- Researchers - Data Analysts	₱ 1,500	- CENRO - LP Office - Virtual Meetings	- Data Analysis Tools	- To generate appropriate, evidence-based, program plan
		Finalize program materials and surveys	- Researchers - Validators	₱ 3,000	- CENRO -LP Office	- Educational Materials - Survey Forms	- To generate program materials and surveys tailored to participants' needs.
		Coordinate with Municipal	- Researchers	₱ 500	- Municipal	- Schedule Plan	- To generate scheduled and

		Health Officer to develop a schedule for health education session	- Municipal Health Officer		Health Office - Virtual Meetings	- Educational Resources	approved health program sessions.

The following table outlines the Phase 1: Planning stage of the AKAP-PALERO program for the first 2 months. This phase focuses on setting the foundation for successful implementation by detailing the timeframe, duration, key activities, responsible persons, proposed budget, venue, and resources to be used.

Table 9: Table 9, *Timeline of Activities for Proposed Program # 1 - Phase 2: Awareness Campaign*
Table 9. Timeline of Activities for Proposed Program # 1 - Phase 2: Awareness Campaign

PHASE 2: AWARENESS CAMPAIGN							
TIME FRAME	**DURATION**	**ACTIVITIES**	**PERSONS RESPONSIBLE**	**PROPOSED BUDGET**	**VENUE**	**RESOURCES**	**EXPECTED OUTCOMES**
MONTH 3 - 4 MAY - JUNE 2024	2 MONTHS	Launch the AKAP-PALERO program with an opening ceremony	- Researchers - Stakeholders	₱ 5,000	- Las Pinas Dump Site	- Educational Materials - AV Materials - Speakers - Souvenirs	- To raise awareness on respiratory health risks and program objectives
		Conduct targeted awareness seminars for long-term garbage collectors about respiratory risks and preventive measures.	- Researchers - Health Educators - CENRO-LP Staff	₱ 3,000	- Las Pinas Dump Site	- Educational Materials - Speakers - Survey Tools	- To raise awareness on respiratory health risks and preventive measures
		- Distribute informational materials (posters, pamphlets) to employees	- Researchers - Health Educators	₱ 500	- Las Pinas Dump Site	- Posters - Pamphlets - Distribution Log	- To ensure broad dissemination of critical health information and ensure

							accessibility to participants.
		- Conduct a pre-program survey to assess baseline knowledge.	- Researchers - CENRO-LP Staff	₱ 500	- Las Pinas Dump Site	- Survey Tools - Pre-Survey Forms	- To establish baseline knowledge levels for comparison after post-program levels.

The following table outlines the Phase 2: Awareness Campaign of the AKAP-PALERO program for months 3 - 4. This phase focuses on raising awareness among long-term garbage collectors about respiratory health risks and preventive measures, distributing educational materials, and conducting a pre-program survey to establish baseline knowledge levels. These efforts aim to enhance participant engagement and provide initial data for evaluating the program's effectiveness.

Table 10: Table 10, *Timeline of Activities for Proposed Program # 1 – Phase 3: Engagement and Participation*
Table 10. Timeline of Activities for Proposed Program # 1 – Phase 3: Engagement and Participation

PHASE 3: ENGAGEMENT AND PARTICIPATION							
TIME FRAME	**DURATION**	**ACTIVITIES**	**PERSONS RESPONSIBLE**	**PROPOSED BUDGET**	**VENUE**	**RESOURCES**	**EXPECTED OUTCOMES**
MONTH 4-5 JUNE - JULY 2024	2 MONTHS	Host engagement sessions focusing on the specific health concerns of long-term garbage collectors.	- Researchers - Health Educators - CENRO - LP Staff	₱ 5,000	- Las Pinas Dump Site	- Educational Materials - AV Materials - Speakers - Certificates and tokens	- To raise awareness on respiratory health risks and actively involve garbage collectors.
		Promote participation in program activities through group discussion	- Researchers - Health Educators - CENRO-LP Staff	₱ 3,000	- Las Pinas Dump Site	- Incentive Materials - Group Discussion guides	- To increase program participation through interactive and motivational activities.

		s and incentives.					
		- Register long-term garbage collectors for health screenings	- Researchers - CENRO - LP	₱ 500	- Las Pinas Dump Site	- Registration Forms - Health Screening Schedules	- To ensure a comprehensive registration of participants, to facilitate accurate tracking and service delivery.

The following table highlights the Phase 4: Engagement and Participation activities, which spans months 4 - 5 of the AKAP-PALERO program. It focuses on fostering active involvement from garbage collectors by addressing their specific health concerns and promoting participation in program activities. The engagement sessions and group discussions are designed to create a supportive environment for addressing health issues. On the other hand, incentives are offered to motivate participation. A formal registration process for health screenings is also established to ensure streamlined tracking of participants and service delivery.

Table 11: Table 11, *Timeline of Activities for Proposed Program # 1 - Phase 4: Resources Enhancement*
Table 11. Timeline of Activities for Proposed Program # 1 - Phase 4: Resources Enhancement

PHASE 4: RESOURCES ENHANCEMENT							
TIME FRAME	**DURATION**	**ACTIVITIES**	**PERSONS RESPONSIBLE**	**PROPOSED BUDGET**	**VENUE**	**RESOURCES**	**EXPECTED OUTCOMES**
MONTH 6 - 8 AUGUST - NOVEMBER 2024	3 MONTHS	Provide enhanced access to health resources (e.g., free check-ups, medications, symptom management materials) for garbage collectors	- Researchers - CENRO-LP Staff - LP Health Office - Medical Team	₱ 3, 000	Las Pinas City Dump Site	- Medications - Check-up Kits - Educational Materials	- To improve health outcomes through access to critical resources, including free check-ups and medications.
		Distribute educational	- Researchers - CENRO-LP Staff	₱ 1,000	- Las Pinas	- Education	- To increase knowledge

		materials tailored to long-term workers' needs	- Medical Team		Dump Site	al Materials	retention and understanding of health management among garbage collectors.
		Involve local schools by engaging nursing students to assist with health screenings and distribute educational materials.	- Researchers - CENRO-LP Staff - LP Health Office - School Admins - Nursing Faculty and Students	₱ 5,000	- Las Pinas Dump Site - Local Schools	- Collaboration Agreements - Campaign Materials - Screening Kits - Medical Personnel - Student Participation	- To increase community involvement and support while providing nursing students with practical learning opportunities.

The table describes Phase 4: Resource Enhancement, spanning MONTHS 6-8 of the AKAP-PALERO program. This phase prioritizes strengthening access and availability of health resources available to the garbage collectors. These activities include providing free medical check-ups, medications, and symptom management materials to address their specific health concerns by equipping them with the necessary resources. Educational materials tailored to the needs of this group are also distributed to ensure a comprehensive approach to health promotion and provide them with sufficient knowledge and information. Furthermore, the phase also includes the involvement of local schools, particularly nursing students, to help distribute educational materials and assist with health screenings. These students will gain valuable practical experience while contributing to the program's success.

Table 12: Table 12, *Timeline of Activities for Proposed Program # 1 - Phase 5: Health Screenings*
Table 12. Timeline of Activities for Proposed Program # 1 - Phase 5: Health Screenings

PHASE 5: HEALTH SCREENINGS							
TIME FRAME	**DURATION**	**ACTIVITIES**	**PERSONS RESPONSIBLE**	**PROPOSED BUDGET**	**VENUE**	**RESOURCES**	**EXPECTED OUTCOMES**
MONTH 9-10 DECEMBER 2024 - JANUARY 2025	2 MONTHS	Conduct respiratory health screenings	- Researchers - CENRO-LP Staff - LP Health Office - Medical Team	₱ 3, 000	Las Pinas City Dump Site	- Screening Kits - Medical Personnel	- To enable early identification of respiratory health issues and ensure

							timely intervention and support for at-risk individuals.
		Partner with local schools for health awareness campaigns, including engaging nursing students to assist in screenings	- Researchers - CENRO-LP Staff - LP Health Office - School Admins - Nursing Faculty and Students	₱ 5,000	- Las Pinas Dump Site - Local Schools	- Collaboration Agreements - Campaign Materials - Screening Kits - Medical Personnel	- To increase community involvement and support while providing nursing students with practical learning opportunities.

The following table outlines Phase 5: Health Screenings, which spans months 9-10 of the AKAP-PALERO program. This phase focuses on assessing the respiratory health of long-term garbage collectors through targeted health screenings. Post-program survey data will also be collected to evaluate changes in respiratory symptoms, daily activity levels, and overall quality of life. These activities aim to measure the program's impact on health outcomes while identifying individuals requiring further medical attention. The collected data will also provide valuable insights for continuous improvement and future program planning. In addition to the screenings, local schools will be engaged through health awareness campaigns, with nursing students participating in the screenings as part of their practical training.

Table 13: Table 13, *Timeline of Activities for Proposed Program # 1 - Phase 6: Program Evaluation and Feedback*
Table 13. Timeline of Activities for Proposed Program # 1 - Phase 6: Program Evaluation and Feedback

PHASE 6: PROGRAM EVALUATION AND FEEDBACK							
TIME FRAME	**DURATION**	**ACTIVITIES**	**PERSONS RESPONSIBLE**	**PROPOSED BUDGET**	**VENUE**	**RESOURCES**	**EXPECTED OUTCOMES**
MONTH 11-12 FEBRUARY - MACH 2025	2 MONTHS	Conduct post-program survey to evaluate changes in respiratory symptoms, activity,	- Researchers - CENRO-LP	₱ 500	Las Pinas City Dump Site	- Survey Tools	- To gather post-program data that can provide insights into changes in participants' respiratory health and quality of life.

		and quality of life for employees					
		Analyze program data and compare with pre-program data to assess effectiveness	- Researchers - Data Analyst/Statistician	₱ 3,000	- CENRO- LP office - Virtual Meetings	- Survey Tools - Data Analysis Software - Statistician Services	To generate a detailed program evaluation report with evidence of effectiveness and recommendations for future interventions.

The table outlines Phase 6: Program Evaluation and Feedback, spanning months 11 - 12 of the AKAP-PALERO program. The phase involves a comprehensive evaluation of the program's impact by collecting and analyzing post-program survey data. The data will be compared with pre-program baseline metrics to assess improvements in the respiratory health of garbage collectors. The findings will guide recommendations for further program adjustments and future initiatives.

Table 14: Table 14, *Proposed Program #2 - Protektadong Paghinga: Kalusugan at Kaligtasan ng Palero*
Table 14. Proposed Program #2 - Protektadong Paghinga: Kalusugan at Kaligtasan ng Palero

PROGRAM TITLE: **PROTEKTADONG PAGHINGA: KALUSUGAN AT KALIGTASAN NG PALERO**	
PROGRAM OBJECTIVE(S):	
General Objective:	To enhance the respiratory health and safety of garbage collectors through a free seminar that educates them on the risks associated with their work environment and equips them with preventive measures and practical solutions to safeguard their lung health.
Specific Objective(s):	- To ensure at least 75% of long-term employees attend the seminar, as measured by attendance records. - To increase participants' knowledge of respiratory health risks by 30% within the seminar, as measured by comparing pre- and post-seminar quiz scores. - To ensure 100% of seminar attendees demonstrate at least one practical solution learned from the seminar with at least an 80% score, as measured by participation in practical demonstrations. - To provide at least 80% of participants with educational materials about respiratory health and safety measures. - To gather feedback from at least 80% of seminar participants on the effectiveness of the seminar using a post-seminar evaluation form.
RATIONALE:	Garbage collectors are at high risk of respiratory issues due to prolonged exposure to hazardous materials in their work environment. Despite this, many are unaware of the specific risks or preventive measures. Thus, this free seminar

	aims to educate garbage collectors on respiratory health, safety practices, and practical solutions they can easily and readily apply.
RESOURCES:	
TARGET POPULATION:	All Garbage Collectors employed under the City Environment and Natural Resources Office - Las Pinas (CENRO-LP)
VENUE:	Las Pinas City Dump Site under City Environment and Natural Resources Office - Las Pinas (CENRO-LP)
FUNDING SOURCE(S):	Government Health and Welfare Funds, Grants and Donations from Non-Governmental Organizations, and Crowdfunding and Community Donations

The table outlines the proposed schedule for the Protektadong Paghinga: Kalusugan At Kaligtasan ng Palero Program. The program aims to enhance garbage collectors' respiratory health through education, practical solutions, and preventive measures. It targets Las Piñas CENRO employees and will be held at the city dump site, funded by government grants and community donations. The initiative addresses occupational health risks and equips participants with knowledge and tools for safer work practices.

Table 15: Table 15, *Flow of Proposed Program #2 - Protektadong Paghinga: Kalusugan at Kaligtasan ng Palero*
Table 15. Flow of Proposed Program #2 - Protektadong Paghinga: Kalusugan at Kaligtasan ng Palero

PROPOSED PROGRAM FLOW FOR PROTEKTADONG PAGHINGA: KALUSUGAN AT KALIGTASAN NG PALERO						
TIME	**ACTIVITIES**	**PERSONS RESPONSIBLE**	**EST. PROPOSED BUDGET**	**VENUE**	**RESOURCES**	**EXPECTED OUTCOMES**
8:00 AM - 8:30 AM	Registration and Welcome	-Researchers -CENRO-LP Staff	₱ 500	Las Pinas City Dump Site	- Registration forms - Name tags - Pens - Welcome materials	- To ensure a smooth start to the program by organizing participants and providing a welcoming atmosphere.
8:30 AM - 9:00 AM	Opening Remarks and Introduction	-Researchers -CENRO-LP Staff	₱ 500	Las Pinas City Dump Site	- Projector - Microphone - Chairs and Tables - Program agenda	- To orient participants to the program's purpose and goals
9:00 AM - 9:15 AM	Pre-Test Assessment	-Researchers	₱ 500	Las Pinas City Dump Site	- Testing Materials	- To establish baseline data on participants' knowledge for measuring knowledge

						gain post-seminar.
9:15 AM - 10:00 AM	Session 1: Understanding Respiratory Health Risks of MSW Exposure to Garbage Collectors	-Researchers - Speaker/s (Registered Health Professionals)	₱ 3000 (including speaker fee)	Las Pinas City Dump Site	- Speaker - AV Materials - Presentation slides - Handouts on respiratory risks	- To educate participants on the health risks of MSW exposure and its impact on respiratory health.
10:00 AM - 10:30 AM	Break	-Researchers	₱ 1000	Las Pinas City Dump Site	- Food & Refreshments - Chairs & Tables	- To refresh participants and maintain their focus and energy for the remainder of the program.
10:30 Am - 11:30 AM	Session 2: Practical Solutions to Protect Respiratory Health with Demonstration. Including: - Personal Hygiene Practices - Breathing Techniques - Proper use of PPE - Improved Waste Handling Technique	-Researchers -Speaker/s (Registered Health Professionals, Occupational Safety Expert, etc.)	₱ 3000 (including speaker fee)	Las Pinas City Dump Site	- Speaker - AV Materials - Demonstration materials - Handouts on preventive measures	- To provide participants with actionable strategies to protect their respiratory health, including the proper use of PPE.
11:30 - 12 PM	Demonstration of at least 1 practical solution learned through the seminar	- Researchers - Registered Health Professionals	₱ 2000	Las Pinas City Dump Site	- Demonstration materials	- To enable participants to practice and apply the preventive techniques learned in the seminar.

12:30 PM - 1:00 PM	Break	-Researchers	₱ 2000	Las Pinas City Dump Site	- Food & Refreshments - Chairs & Tables	- To provide a comfortable break for participants, promoting a positive program experience.
1:00 PM- 1:15 PM	Post-Test Assessment	-Researchers	₱ 500	Las Pinas City Dump Site	- Testing Materials	- To evaluate participants' knowledge gain and understandin g of the seminar content.
1:15 PM - 1:30 PM	Interactive Q&A Session	-Researchers - Speaker/s (Registered Health Professionals, Occupational Safety Expert, etc.)	₱ 0	Las Pinas City Dump Site	- Speakers - AV Materials	- To clarify doubts, engage participants, and reinforce learning outcomes.
1:30PM - 2:00 PM	Post-Seminar Evaluation	-Researchers	₱ 500	Las Pinas City Dump Site	- Testing Materials	- To clarify doubts, engage participants, and reinforce learning outcomes.
2:00 PM - 2:15 PM	Closing Remarks & Distribution of Educational Materials	-Researchers - Speaker/s (Registered Health Professionals, Occupational Safety Expert, etc.) -CENRO-LP Staff	₱ 500	Las Pinas City Dump Site	- Speakers - AV Materials - Handouts	- To conclude the program by summarizing key points and providing participants with valuable educational resources.

The table outlines the proposed schedule for the Protektadong Paghinga: Kalusugan At Kaligtasan ng Palero Program, outlining activities, responsible persons, budget, venue, resources, and expected outcomes. It covers the program's flow from registration to closing, focusing on education, practical demonstrations, assessments, and feedback collection. Each activity is designed to enhance participants' respiratory health awareness and equip them with practical solutions for their long-term health and well-being.

Table 16: Table 16, *Proposed Program #3 - Alaga't Ginhawa: Ang Karavan ng Kalusugan*

Table 16. Proposed Program #3 - Alaga't Ginhawa: Ang Karavan ng Kalusugan

PROGRAM TITLE: **ALAGA'T GINHAWA: ANG KARAVAN NG KALUSUGAN**	
PROGRAM OBJECTIVE(S):	
General Objective:	To improve the respiratory health of garbage collectors by enhancing access to health resources, screenings, and preventive care through active participation from nursing students from Saint Francis of Assisi College - Las Pinas.
Specific Objective(s):	- To conduct respiratory health screenings for at least 75% of the total number of garbage collectors. - To provide access to at least 70% of participants for follow-up consultations and care. - To involve at least 70% of nursing students from the 2nd - 4th years level in the screening process, health education, and follow-up activities. - To improve knowledge of respiratory health risks among participants by at least 30%.
RATIONALE:	Long-term exposure to hazardous materials puts garbage collectors at high risk for respiratory issues. This program aims to enhance access to vital health resources, such as screenings, medical consultations, and preventive care through a free health caravan for timely intervention, monitoring, and treatment. Furthermore, this program provides nursing students with practical experiences in community health and involvement to help instill a sense of social responsibility. Through active participation, these students can also foster their skills in health promotion and patient education.
RESOURCES:	
TARGET POPULATION:	All garbage collectors employed under the City Environment and Natural Resources Office - Las Pinas (CENRO-LP)
VENUE/S:	City Environment and Natural Resources Office - Las Pinas (CENRO-LP) OFFICE Las Pinas City Dump Site under City Environment and Natural Resources Office - Las Pinas (CENRO-LP)
FUNDING SOURCE(S):	Government Health and Welfare Funds, Grants and Donations from Non-Governmental Organizations, and Crowdfunding and Community Donations

The table above presents the proposed program for Alaga't Ginhawa: Ang Karavan ng Kalusugan, a free health caravan dedicated to improving the respiratory health of garbage collectors. The program offers health screenings, medical consultations, and educational sessions to raise awareness of respiratory risks and promote preventive care. Nursing students from SFAC-LP are recommended to actively participate to gain invaluable hands-on experience in community health while contributing to meaningful public service. Targeting garbage collectors under the City Environment and Natural Resources Office - Las Piñas (CENRO-LP), the initiative seeks to bridge healthcare gaps and provide vital resources.

Table 17: Table 17 *Flow of Proposed Program #3 - Alaga't Ginhawa: Ang Karavan ng Kalusugan*
Table 17. Flow of Proposed Program #3 - Alaga't Ginhawa: Ang Karavan ng Kalusugan

PROPOSED PROGRAM FLOW FOR ALAGA'T GINHAWA: ANG KARAVAN NG KALUSUGAN						
TIME	**ACTIVITIES**	**PERSONS RESPONSIBLE**	**EST. PROPOSED BUDGET**	**VENUE**	**RESOURCES**	**EXPECTED OUTCOMES**
8:00 AM - 8:30 AM	Registration and Welcome	-Researchers -CENRO-LP Staff	₱ 500	Las Pinas City Dump Site	- Registration forms - Name tags - Pens - Welcome materials	- To ensure a smooth start to the program by organizing participants and providing a welcoming atmosphere.
8:30 AM - 9:00 AM	Opening Remarks and Introduction	-Researchers -CENRO-LP Staff	₱ 500	Las Pinas City Dump Site	- Projector - Microphone - Chairs and Tables - Program agenda	- To introduce the health caravan's objectives and provide an overview of the program activities.
9:00 AM - 10:00 AM	Respiratory Health Screenings	- Researchers - Medical Team - Nursing Students - Clinical Instructors	₱ 5000	Las Pinas City Dump Site	- Screening Kits - Medical Equipment	- To identify respiratory health concerns and offer timely recommendations for follow-up care.
10:00 AM - 10:15 AM	Break	-Researchers -Nursing Students	₱ 1000	Las Pinas City Dump Site	- Food & Refreshments - Chairs & Tables	- To refresh participants and maintain their focus and energy for the remainder of the program.
10:15AM - 11:15 AM	Session 1: Understanding Respiratory Risks and Practical Solutions for Protecting Respiratory Health	- Researchers - Health Professionals - Nursing Students	₱ 3,000 (including speaker fee)	Las Pinas City Dump Site	- Speaker - AV Materials - Demonstration materials - Handouts on preventive measures	- To educate participants on respiratory health risks and effective preventive strategies.

11:15 AM - 11: 30 AM	Interactive Q&A Session	-Researchers - Registered Health Professionals	₱ 0	Las Pinas City Dump Site	- Speakers - AV Materials	- To clarify questions, engage participants, and reinforce learning outcomes.
11:30 AM - 11:45 AM	Provision of Health Resources (e.g. Medication, PPE, etc.) and educational resources	-Researchers - CENRO-LP Officials - Nursing Students	₱ 1000	Las Pinas City Dump Site	- Health Resources (e.g. Medication, PPE, etc.) - Educational Materials and Handouts	- To provide participants with resources and materials for continued health improvement.
11:45 AM - 12 AM	Closing Remarks and Feedback Collection	-Researchers - Registered Health Professionals -CENRO-LP Staff	₱ 0	Las Pinas City Dump Site	- Speakers - AV Materials - Handouts - Evaluation Forms	To conclude the program by summarizing key takeaways and collecting feedback for future program improvement.

This table outlines the Proposed Program Flow for Alaga't Ginhawa: Ang Karavan ng Kalusugan, a free health caravan dedicated to improving the respiratory health of garbage collectors. The program includes essential activities such as registration, health screenings, educational sessions on respiratory risks, practical demonstrations, and resource distribution. These initiatives seek to provide immediate healthcare support, increase awareness of respiratory risks, and equip participants with practical preventive strategies.

To enhance the program's impact, nursing students from SFAC-LP are encouraged to actively participate by assisting with health screenings, delivering educational content, and distributing resources. This involvement will also provide the students with valuable practical experience in community health nursing.

3) CONCLUSIONS AND RECOMMENDATIONS

Conclusion

This study assessed the respiratory health outcomes of 71 garbage collectors under CENRO-Las Piñas exposed to Municipal Solid Waste (MSW). The results indicate that continuous exposure to MSW is associated with increased respiratory symptoms and activity limitations compared to individuals without respiratory diseases. Statistical analysis revealed no significant difference in respiratory health outcomes based on age; however, length of employment showed a significant impact, with workers employed for >10 years demonstrating poorer respiratory health. These findings suggest that prolonged occupational exposure to MSW contributes to a gradual decline in respiratory function, thus emphasizing the need for preventive and protective interventions for this vulnerable workforce.

Recommendations

For Garbage Collectors

It is recommended that garbage collectors undergo regular respiratory assessments, treatments, and symptom monitoring to track any changes in their health. Long-term workers should particularly comply with routine respiratory screenings to ensure early diagnosis and intervention of any respiratory conditions. Garbage collectors should also follow established health and safety protocols to minimize exposure to hazardous materials.

For CENRO Officials and Policymakers:
CENRO officials should install proper ventilation systems in waste management and sorting areas to reduce exposure to dust, fumes, and airborne contaminants. Routine site inspections are necessary to maintain a safe working environment. Targeted health programs such as "Aksyong pang-Kalusugan at Alaga sa Paghinga ng Palero (AKAP-MP)" and "Protektadong Paghinga" should be implemented, focusing on long-term employees who are at higher risk.
For the Community and Schools:
Households are encouraged to practice proper waste segregation to limit garbage collectors' direct contact with hazardous waste. Schools should educate students about the respiratory health risks garbage collectors face and the importance of community health participation. Collaboration between schools and local government units is also recommended to create and sustain health programs for garbage collectors.
For Future Researchers:
Future studies should involve larger, more diverse populations to identify general and region-specific respiratory health risks associated with MSW exposure. Research should also explore other contributory factors affecting respiratory outcomes. Given the significant impact of length of employment on respiratory health, longitudinal studies are suggested to monitor long-term effects of exposure among garbage collectors.

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7) Conflict of Interest: The authors declare that there is no conflict of interest.

8) REFERENCES
[1]. Laor, P., Suma, Y., Keawdounglek, V., Hongtong, A., Apidechkul, T., & Pasukphun, N. (2018). Knowledge, attitude and practice of municipal solid waste management among highland residents in Northern Thailand. Journal of Health Research, 32(2), 123–131. https://doi.org/10.1108/jhr-01-2018-013
[2]. Papageorgiou, C. V., Savourdos, P., Douna, E., Georgakopoulou, V. E., Makrodimitri, S., & Dounias, G. (2021). Respiratory symptoms and pulmonary function of workers in the waste management industry. Cureus. https://doi.org/10.7759/cureus.17027
[3]. Ye, Q., Asmi, F., Anwar, M. A., Zhou, R., & Siddiquei, A. N. (2021). Health concerns among waste collectors during pandemic crisis. Environmental Science and Pollution Research, 29(5), 6463–6478. https://doi.org/10.1007/s11356-021-16071-y
[4]. Roy, P., Mohanty, A. K., Wagner, A., Sharif, S., Khalil, H., & Misra, M. (2021). Impacts of COVID-19 Outbreak on the Municipal Solid Waste Management: Now and beyond the Pandemic. ACS Environmental Au, 1(1), 32–45. https://doi.org/10.1021/acsenvironau.1c00005
[5]. World Bank Group. (2018, September 24). Global Waste to Grow by 70 Percent by 2050 Unless Urgent Action is Taken: World Bank Report. World Bank. https://www.worldbank.org/en/news/press-release/2018/09/20/global-waste-to-grow-by-70-percent-by-2050-unless-urgent-action-is-taken-world-bank-report
[6]. Garnett, E., Balayannis, A., Hinchliffe, S., Davies, T., Gladding, T., & Nicholson, P. (2022). The work of waste during COVID-19: logics of public, environmental, and occupational health. Critical Public Health, 32(5), 630–640. https://doi.org/10.1080/09581596.2022.2048632
[7]. Apostol, G. L. C., Acolola, A. G. A., Edillon, M. A., & Valenzuela, S. (2022). How comprehensive and effective are waste management policies during the COVID-19 pandemic? Perspectives from the Philippines. Frontiers in Public Health, 10. https://doi.org/10.3389/fpubh.2022.958241
[8]. St. George's Respiratory Questionnaire (SGRQ). (n.d.).

https://www.thoracic.org/members/assemblies/assemblies/srn/questionaires/sgrq.php
[9]. Salvaraji, L., Jeffree, M. S., Avoi, R., Akhir, H. M., Rahim, S. S. S. A., & Lukman, K. A. (2020). Factors of respiratory symptoms among domestic waste collectors. Medeniyet Medical Journal. https://doi.org/10.5222/mmj.2020.82246
[10]. Tlotleng, N., Kootbodien, T., Wilson, K., Made, F., Mathee, A., Ntlebi, V., Kgalamono, S., Mokone, M., Du Preez, K., & Naicker, N. (2019). Prevalence of Respiratory Health Symptoms among Landfill Waste Recyclers in the City of Johannesburg, South Africa. International Journal of Environmental Research and Public Health, 16(21), 4277. https://doi.org/10.3390/ijerph16214277
[11]. Madsen, A. M., Raulf, M., Duquenne, P., Graff, P., Cyprowski, M., Beswick, A., Laitinen, S., Rasmussen, P. U., Hinker, M., Kolk, A., Górny, R. L., Oppliger, A., & Crook, B. (2021). Review of biological risks associated with the collection of municipal wastes. The Science of the Total Environment, 791, 148287. https://doi.org/10.1016/j.scitotenv.2021.148287
[12]. Volpato, E., Banfi, P., & Verkleij, M. (2023). Editorial: The psychological challenges of respiratory disease. Frontiers in Psychology, 14. https://doi.org/10.3389/fpsyg.2023.1213963
[13]. Oracion, E. G., De La Rama, P. A., & Oracion, J. H. M. (2018). Waste Exposure and Self-Reported Health Quality of Waste Workers. Philippine Sociological Review, 66, 29–52. https://www.jstor.org/stable/26789723

9) Miscellaneous

Table 18: Table 18, St. George's Respiratory Questionnaire (SGRQ) Reference Values For Healthy Subjects Based on the SGRQ Manual

Table 18. St. George's Respiratory Questionnaire (SGRQ) Reference Values For Healthy Subjects Based on the SGRQ Manual

SGRQ SCORES IN 74 NORMAL SUBJECTS AGED 17 - 80 Y/O WITH NO HISTORY OF RESPIRATORY DISEASE

	COMPONENT SCORES			TOTAL SCORE
	SYMPTOMS	ACTIVITY	IMPACT	
AVERAGE SCORE	12	9	2	6
AVERAGE RANGE	9 - 15	7 - 12	1 - 3	5 - 7

Table 18 presents the reference values of the Saint George's Respiratory Questionnaire (SGRQ) for healthy individuals, based on data from 74 subjects aged 17 to 80 with no history of respiratory disease as outlined in the March 2020 St. George's Respiratory Questionnaire (SGRQ) manual. These values serve as baseline comparisons for identifying respiratory health issues in other populations.