Community-Based Risk Factor Surveillance and Its Role in Prevention of Non-Communicable Diseases in Padang: A Qualitative Study

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Abstract

The rise in non-communicable diseases (NCDs) is driven by risk factors such as smoking, physical inactivity, low consumption of fruits and vegetables, and alcohol use. Community-based surveillance of these risk factors is essential for NCD prevention; however, the availability and use of accurate data remain limited in many regions. Therefore, research is needed to enhance both the quality and utilization of surveillance data in NCD prevention efforts. This study aims to examine community-based risk factor surveillance activities and their role in preventing NCDs in Padang. A qualitative approach using a phenomenological method was employed. Research informants included individuals responsible for NCD programs at community health centers, health cadres, and members of the productive-age population in Padang in 2024. Informants were selected through purposive sampling. Data were primarily collected via in-depth interviews guided by a structured interview protocol. Interview transcripts were analyzed using an interactive analysis model, which included data reduction, data presentation, and conclusion drawing/verification. Findings indicate that risk factor data collection at integrated health posts was conducted both manually and electronically, with data entered into the Ministry of Health's Asik application. Data processing and analysis were performed using the Asik application, with descriptive interpretations presented in tables and diagrams. Dissemination of risk factor information occurred through mini-workshops, although not all stakeholders were involved. Surveillance results were used to inform NCD prevention programs through counseling and community outreach. Overall, community-based risk factor surveillance data were collected manually and electronically via the Asik application, analyzed descriptively, and disseminated through workshops and follow-up activities supporting NCD prevention. The study highlights the need to improve the quality and use of community-based surveillance data, increase stakeholder engagement, evaluate intervention effectiveness, and assess the impact of surveillance applications on data processing and ongoing monitoring of NCD risk factors.

Keyword: Surveillance, Risk Factors, Prevention, Non-Communicable Diseases.

INTRODUCTION

Non-communicable diseases (NCDs) are the leading cause of disease burden and mortality worldwide, particularly in developing countries. The growing prevalence of NCDs aligns with the rise in key risk factors such as smoking, physical inactivity, low consumption

of fruits and vegetables, and alcohol use (Bihungum Bista et al., 2021). The high prevalence of NCDs and their associated risk factors is projected to increase by 2030, affecting not only the health and quality of life of individuals and families but also the socioeconomic status of nations. The World Health Organization (WHO) estimates that NCDs will result in substantial losses in national income across various countries, with developing nations being disproportionately affected. According to WHO data, approximately 75% of global deaths are attributed to NCDs, and the majority of these deaths are preventable through effective control of key risk factors (Word Health Organization, 2024; World Health Organization, 2023)

The primary risk factors for non-communicable diseases (NCDs) include smoking, physical inactivity, unhealthy diets, particularly low consumption of fruits and vegetables, and alcohol use (Peters et al., 2019). Smoking is a major contributor to various chronic illnesses and premature death(Amin et al., 2024). Additionally, sedentary lifestyles and poor dietary habits further increase the risk of developing NCDs(Kuruvilla et al., 2023). Collectively, smoking, physical inactivity, inadequate fruit and vegetable intake, and excessive alcohol consumption are key determinants in the onset and progression of NCDs (Wahidin et al., 2022).

In Indonesia, the trend of non-communicable diseases (NCDs) is showing an alarming rise. Data from the 2018 Basic Health Research (Riskesdas) reveal an increase in the prevalence of high blood pressure from 25.8% to 34.1%, obesity from 14.8% to 21.8%, and a growing rate of smoking among adolescents. In West Sumatra Province, the prevalence of key risk factors remains high, including insufficient vegetable consumption (96.8%), physical inactivity (39.4%), smoking (26.9%), and obesity (21.2%). In Padang specifically, the prevalence of hypertension reached 21.7%, while both diabetes mellitus and obesity were reported at 2.4% (Kementerian Kesehatan RI, 2019a).

Given the high burden of non-communicable diseases (NCDs), effective prevention and control strategies are essential—particularly those involving risk factor surveillance. Surveillance of NCD risk factors is a systematic and continuous effort to identify and monitor the factors contributing to the rising prevalence of NCDs within communities. At the community level, prevention efforts begin with the establishment of Integrated Guidance Posts (*Posbindu*), which focus on early detection of risk factors, counseling, and promoting community-based activities that encourage healthy behaviors. Active community participation is crucial in supporting disease prevention initiatives (Kementerian Kesehatan RI, 2019b).

Community-based risk factor surveillance plays a vital role in actively identifying and reporting health risks within the population, while also fostering community participation. This approach helps reduce the burden of non-communicable diseases (NCDs) by enabling

timely prevention and control measures. The information gathered through surveillance can be used to support follow-up activities such as public education and awareness campaigns. Community-based surveillance is a particularly effective strategy for addressing various public health challenges, especially in the early detection and reporting of risk factors (Guerra et al., 2019)

The implementation of risk factor surveillance in the field continues to face numerous challenges. As such, qualitative research is essential to explore the experiences, constraints, and needs of those involved in surveillance efforts, and to gain a deeper understanding of the dynamics surrounding the implementation of NCD risk factor surveillance programs. This study aims to qualitatively examine the implementation of community-based risk factor surveillance in the context of non-communicable disease prevention, with the goal of providing relevant recommendations to enhance the effectiveness of NCD control programs at the community level.

METHODS

This study employed a qualitative phenomenological approach to gain an in-depth understanding of the implementation of community-based risk factor surveillance activities and their role in preventing non-communicable diseases (NCDs). The study examined the entire process, including data collection, processing, analysis, interpretation, information dissemination, and follow-up actions. The risk factors assessed included smoking, physical inactivity, insufficient consumption of fruits and vegetables, and alcohol use. The research was conducted in Padang in 2024, specifically at the Ikur Koto, Ulak Karang, and Rawang Community Health Centers. These locations were selected using cluster random sampling. Informants were chosen through purposive sampling and included NCD program managers (Inf 1, 2, and 3), health cadres (Inf 4, 5, and 6), and community members (Inf 7–21). In total, 21 informants participated in the study.

Research data were collected through in-depth, face-to-face interviews with informants. All interviews were recorded using a voice recorder and systematically transcribed. The interview guide served as the primary research instrument and covered several key areas:

- Data collection activities; including methods, challenges, and efforts to improve the quality of risk factor data collection.
- Data processing, analysis, and interpretation; focusing on methods used, constraints encountered, and strategies to enhance data quality.

- Information dissemination; addressing approaches, barriers, and efforts to improve the delivery of risk factor information.
- Follow-up activities; exploring methods, challenges, and initiatives to effectively utilize risk factor data.

To ensure data validity, source triangulation was employed by comparing information obtained from various informants, including those responsible for non-communicable disease programs, health cadres, and community members (Sugiyono, 2019).

Interview data were transcribed and analyzed using an interactive analysis model, which included data reduction, data presentation, and conclusion drawing/verification. The results of the analysis are presented in the form of thematic narratives and an analysis matrix.

This research was conducted following ethical approval from the Research Ethics Committee of the Faculty of Medicine, Andalas University (Approval No. 78/UN.16.2/KEP-FK/2023, dated 16 February 2023), and a research permit from the Padang Integrated Licensing and One-Stop Integrated Service Agency (Permit No. 070.4751/DPMPTSP-PP/III/2023, dated 15 February 2023).

RESULT

Research findings from Padang indicate that surveillance activities for non-communicable disease (NCD) risk factors encompass data collection, processing and analysis, interpretation, information dissemination, and follow-up actions based on surveillance results. Data were obtained from research informants, including NCD program managers, health cadres, and community members. The characteristics of these informants are presented in Table 1.

Table 1. Characteristics of Qualitative Research Informants

No	Informant Code	Informant	Age (Years)	Education
1	Inf 1	Noncommunicable disease program holders at Health Center 1	50	3-year diploma
2	Inf 2	Noncommunicable disease program holders at Health Center 2	40	Bachelor
3	Inf 3	Noncommunicable disease program holders at Health Center 3	45	3-year diploma
4	Inf 4	Cadre 1	53	High School
5	Inf 5	Cadre 2	50	High School
6	Inf 6	Cadre 3	36	Bachelor
7	Inf 7	Society 1	32	Bachelor
8	Inf 8	Society 2	40	Junior high school
9	Inf 9	Society 3	45	Junior high school
10	Inf 10	Society 4	53	High School
11	Inf 11	Society 5	55	Junior high school

No	Informant Code	Informant	Age (Years)	Education
12	Inf 12	Society 6	43	High School
13	Inf 13	Society 7	28	Bachelor
14	Inf 14	Society 8	52	Junior high school
15	Inf 15	Society 9	44	3-year diploma
16	Inf 16	Society 10	45	Junior high school
17	Inf 17	Society 11	51	High School
18	Inf 18	Society 12	17	High School
19	Inf 19	Society 13	33	High School
20	Inf 20	Society 14	56	High School
21	Inf 21	Society 15	38	Bachelor

Based on Table 2, this study involved informants with diverse ages, educational backgrounds, and occupations. Among them, five held a Bachelor's degree, three had a 3-year diploma, eight had completed high school, and five had completed junior high school. The employment status of health-related informants included civil servants, health cadres, and members of the general public, such as private-sector employees, self-employed individuals, and homemakers. The surveillance activities examined in this study included data collection, data processing and analysis, data interpretation, information dissemination, and follow-up actions.

1. Data Collection

During the data collection stage, interviews were conducted with research informants, including individuals responsible for non-communicable disease programs at community health centers, health cadres, and community members. The interviews focused on gathering data related to key risk factors such as smoking, physical inactivity, low consumption of fruits and vegetables, and alcohol use. The findings from these interviews are summarized in the following statement:

"Data collection: There is a manual, and then it is input into ASIK. If we do not have time in the field, we also fill out the form. The flow and SOP for implementing Posbindu are in place. There are two staff members. We regularly conduct monitoring and evaluation with various sectors, including the village head, and involve cadres to find solutions related to visit achievement." (Inf 1).

"To collect data on non-communicable disease risk factors in the community, we go to one location and collect the data there. Then we enter the data into the Asik application. DTKS data is Posbindu's main target. Posbindu data is collected by health center officers, regional supervisors, and cadres. The data collection consists of registration, an interview, and an examination. Data entry is done using a form and Asik app. Cadres assist in recording registrations and measuring weight and height. We train them first. Because I have a lot of work, sometimes it is slow to enter data into the application. A dedicated person should enter this data. SOPs and technical guidelines are in place. Obstacles: Many people are away from

home and are of a productive age. Who works. It is time-consuming to input; you must take it home late at night, while you have much other work. Monitoring and evaluation are done once a month. It is evaluated directly by the health office." (Inf. 2).

"Data collection is done manually and using the Asik app, but the Asik app is complicated, ma'am. There are many things to fill in, so we only enter the essential data. Filling in just one NIK can take quite a long time. The Asik app uses Android, requires a signal, and sometimes experiences interruptions. There are SOPs." (Inf. 3).

Reminding the community to participate in Posbindu activities. Recording and distributing forms. Recording blood pressure and blood sugar results, then submitting them to the health center staff. No obstacles. (Inf. 4).

I measured the waist, arm, and circumference. If the data was incomplete, we visited the person's home. There were no obstacles. I visited the homes, and the activities were carried out in the community (Inf. 5).

It is announced at the mosque. If they do not show up, I will call the community. The registration is done on a form. I record their height, weight, age, and National Identification Number (NIK). There are challenges, like gathering people to participate. During social gatherings and religious studies, I inform them that tomorrow there will be a PTM (Non-Communication) screening (Inf 6).

There will be measurements of height, weight, cholesterol, blood pressure, and education on healthy eating, fruits, vegetables, and physical activity. On weekdays, we are busy at work; during planting and harvesting seasons, we are busy. Hold it after our religious study group (Inf 7).

Health checks include weight, body mass index (BMI), blood draws, and blood pressure measurements. Many of us are farmers here, so weekdays are busy. During religious study groups (Inf 8).

Sometimes we are busy working. During religious study groups (Inf 9).

Health checks are crowded at the mosque. No obstacles (Inf 10).

Health checks, height, weight, counseling on healthy food, cigarettes, and fruit. I cook at home in the morning. Agree during the mosque religious study (Inf 11).

Measure height, weight, cholesterol, blood pressure, and education on healthy food, fruit, vegetables, and physical activity. Sometimes I work during Posbindu activities. If possible, avoid doing it during work hours (Inf 12).

Health checks. I am sometimes not at home. On weekends, I do it (Inf 13).

Their activities involve inviting people to their homes. No obstacles (Inf 14).

Gather to check cholesterol, blood pressure, healthy food, height, weight, and blood sugar. Sometimes I am not at home. If possible, schedule a specific day (Inf 15).

Health checks are held in one location, often moving around. Sometimes I am cooking. Avoid doing them during busy hours (Inf 16).

Education on healthy food, fruit, vegetables, and physical activity. So far, there have not been any. It would be better to provide education with banners, etc. (Inf 17).

I'm in school, so attending the integrated health post (Posbindu) is difficult. Can you give me a pocket book to read? (Inf 18).

Your health check-up activities. Sometimes the timing is not convenient. Increase your education (Inf 19).

People gather to check their cholesterol, blood pressure, healthy eating, height, weight, and blood sugar. Sometimes I join in. It makes the activity more interesting (Inf 20).
Health check-ups, sometimes once a month. No problems (Inf 21).

The results of interviews during the data collection phase of risk factor surveillance activities can be summarized in Table 1.

Table 2. Results of Interviews for Risk Factor Data Collection from Informants

Thematic	Answer	Conclusion
Method	Data collection was recorded using a form to record blood pressure, blood sugar, and uric acid levels. Data on smoking, lack of physical activity, insufficient fruit and vegetable consumption, and alcohol consumption were only collected during *Posbindu* activities. The recorded data were then input into the Asik application. The data source was the DTKS, and standard operating procedures (SOPs) were in place.	Data collection on risk factors for smoking, physical inactivity, low fruit and vegetable consumption, and alcohol consumption was conducted using a form and the Asik application. Data was collected through interviews and input into the Asik application. Data input into the Asik application was not immediate because health workers had multiple duties. The application used an Android phone and sometimes experienced maintenance.
Constraint	Data entry into the Asik app is not immediate and takes a long time, requiring an Android phone and occasional maintenance. This activity occurs during business hours, so some people aren't participating.	Data collection was conducted in the community and included home visits. Cadres announced the implementation of the activity through announcements at the mosque, social gatherings, and phone calls. Often, residents did not attend because the activity was scheduled during work hours. Therefore, this activity should be conducted with mosque religious study activities or on weekends.
Efforts made	The implementation of activities was announced at the mosque, by telephone, and through home visits..	

2. Data Processing, Analysis, and Interpretation

During the data processing and analysis stage, interviews were conducted with research informants, including individuals responsible for non-communicable disease programs at the Ikur Koto, Ulak Karang, and Rawang Community Health Centers in Padang. The findings from these interviews regarding data processing and analysis are presented below:

The data processing and analysis results are already available in the Asik application. They are displayed in percentage form in the report. Manual data entry is not available. The Asik application is cumbersome. Manual data analysis and processing are only for reports submitted to the Health Office. Training is provided for health workers (Inf 1).
Complete data must be entered into Asik using the Asik application to produce results. The report does provide data on the number of smokers and obesity in percentage form. However, there is no correlation between the data and the data. It is only descriptive and provides conclusions. Challenges when using Asik: Too many questions make the input process time-consuming. The content in Asik is not the same as the form; the form only provides an outline.

The Asik application requires an Android phone. The health office assists in data interpretation. Training is not routine. Efforts made include participating in training on data processing and analysis procedures. Monitoring and evaluation is conducted once a month (Inf 2).
We do not process data; we only create summaries to report to the health office. Percentages are used to represent the results. Because we use Android, a signal is required. Data processing is manual. Attend training conducted by the health office (Inf 3).

Table 3. Interview Results: Processing, Analysis, and Interpretation of Risk Factor Data on Informants

Thematic	Answer	Conclusion
Method	After data is input/entered into the Asik application, data processing and analysis are automatically performed in the Asik application. The analysis is descriptive, while interpretation is done using proportions or percentages by NCD officers at community health centers, assisted by the city health office.	Processing and analysis are automated in the Asik application. Data analysis is descriptive, and interpretation is performed proportionally or percentage-wise by health workers, assisted by the city health office team. The data application occasionally undergoes maintenance, and monitoring, evaluation, and training for health workers have been conducted.
Constraint	There are too many questions on the Asik app, which takes a long time to complete. The Asik app sometimes undergoes maintenance.	
Efforts made	Monitoring and evaluation are carried out, and training is provided for health workers.	

3. Dissemination of Information

During the information dissemination stage, interviews were conducted with research informants responsible for non-communicable diseases at the Ikur Koto Community Health Center, Ulak Karang Community Health Center, and Rawang Community Health Center in Padang. The results of the interviews regarding information dissemination are as follows:

"During mini-workshops, reports were submitted to the village head, the agency, cadres, and the district head." There were no obstacles. We routinely conduct cross-sector monitoring and evaluation, including the village head, and involve cadres to find solutions to address the visit performance (Inf1).
This was socialized at mini-workshops once a month. Evaluations were conducted by the agency (Inf2).
Mini-workshops were only reported to the village head and the city health agency. Not all stakeholders attended (Inf3).

Table 4. Results of Interviews on Dissemination of Risk Factor Information to Informants

Thematic	Answer	Conclusion
Method	Report and socialized in mini workshop	Information dissemination was carried out in the form of a report and socialized in a mini-workshop. Not all stakeholders were present. To address these challenges,
Constraint	Not all relevant stakeholders were present	

Efforts made	Conduct monitoring and evaluation.	monitoring and evaluation were conducted by the Department.

4. Follow-up

In the follow-up phase, interviews were conducted with research informants responsible for non-communicable diseases, cadres, and community members at the Ikur Koto Community Health Center, Ulak Karang Community Health Center, and Rawang Community Health Center in Padang. The results of the interviews regarding follow-up on risk factor surveillance results are as follows:

"It is used for data from community health centers (Puskesmas) and the Health Office. Cadres are rarely trained, only through socialization. It is used for future program planning to prevent risk factors for non-communicable diseases (NCDs) through education. The resulting data can be used for future budget allocations." (Inf 1).
"The results are provided to the health office and community health centers. The only questionable aspect is whether the monitoring and evaluation will be conducted if there are few targets. Improvement is needed for community education." (Inf 2).
"For SPM and NCD data. Program planning to improve community education." (Inf 3).
I usually participate in the Lokmin (Non-communicable disease) program. I receive training. Many are afraid of blood sugar checks. Public understanding is still lacking (Inf 4).
I am included in the Lokmin program. Thankfully, there are no obstacles. Socialization and outreach are needed for the Posbindu (NCDs) risk factor activities (Inf 5).
I am involved in the Lokmin program. There is no training. I gave information during a social gathering or religious study that there would be a PTM screening tomorrow (Inf 6).
We often hold counseling sessions (Inf 7).
We have counseling sessions, which are still rare (Inf 8).
We have counseling sessions, but still a few (Inf 9).
Sometimes, counseling sessions are held at the village head's office (Inf 10).
We have them at the community health center and have been providing more education in the community (Inf 11).
We have them at the community health center, but since COVID-19, none have been (Inf 12).
Sometimes, there are meetings about health at the community health center, but there are not many in the community (Inf 13).
We have counseling sessions at the community health center, but we ask questions. We want more frequent counseling sessions if possible (Inf 14).
We sometimes have counseling sessions (Inf 15).
Sometimes, they are at the integrated health post (Posyandu) if you want to check your blood pressure (Inf 16).
We have them, and they first ask if you smoke or not. Are you participating? Exercise, eat fruits and vegetables (Inf 17).
If you are overweight, you will be told to cut back on this and that (Inf 18).
I asked if there are any guidelines for consuming fruits and vegetables, physical activity, etc. (Inf 19).

There are, but there needs to be more outreach (Inf 20).
There should be more educational programs so people think more about their health, because we have a diverse population here. So, there should be more education so more people here know. Education can be done through billboards and banners. (Inf 21).

Table 4. Results of Follow-up Interviews on Risk Factor Data for Informants

Thematic	Answer	Conclusion
Follow-up	Used for prevention program planning and SPM data. Follow-up actions include counseling and outreach.	Follow-up surveillance results are used for non-communicable disease prevention programs. There is a need to increase education through regular counseling and outreach.
Constraint	Extension activities are still lacking.	
Efforts made	Improve outreach by monitoring and evaluating prevention program activities.	

DISCUSSION

Community-based surveillance is a continuous and sustainable activity conducted by community health cadres through direct observation or monitoring. It involves reporting and providing information to the health team about the health status of the community, the presence of diseases, and associated risk factors within the community and its environment. This approach supports community independence through prevention and control efforts (Nursakiah, 2022). Community-based risk factor surveillance encompasses data collection, processing, analysis, interpretation, information dissemination, and follow-up actions.

1. Data Collection

Surveillance data collection for non-communicable disease (NCD) risk factors is conducted both manually and electronically. Manual recording is carried out using standardized forms, while electronic recording is performed using the Asik application provided by the Ministry of Health. The manual data are subsequently digitized for further processing. The resulting data offer an overview of key risk factors that can inform NCD prevention efforts (Nugraheni et al., 2022). Surveillance activities include primary data collection through blood pressure screening at *Posbindu*, data processing via the ePus application, and integration into the Non-Communicable Disease Information System (Kevina Shahla et al., 2025).

Risk factor data collection is conducted through both active and passive methods. Active data collection involves direct engagement by health workers and cadres, who gather data within the community and occasionally through home visits. Passive data collection, on the other hand, relies on individuals visiting the integrated service post (*Posbindu*), where health workers then input the collected data into the Ministry of Health's Asik application. Similarly, research conducted at the North Kota Community Health Center utilized both active and passive approaches for data collection at *Posbindu* (Nugraheni et al., 2022). This contrasts

with the findings of Hilmawan et al., who reported that data collection was conducted passively by receiving reports from community health centers implementing the NCD *Posbindu* program (Hilmawan Saputra et al., 2017)

Community-based risk factor surveillance relies on active participation in health screenings, as well as the collection and reporting of non-communicable disease (NCD) risk factors. Community involvement is evident through participation in *Posbindu* (Community Health Posts), which emphasize the community's proactive role in the early detection of NCD risk factors. This early identification enables promotive and preventive interventions before conditions progress into serious complications. The effectiveness of *Posbindu* activities depends on strong community support. Active participation not only enhances the program's impact but also reinforces its sustainability, as the success of early detection and behavior change efforts is closely tied to collective involvement and commitment (Arsila et al., 2024).

Activities at non-communicable disease health posts (*Posbindu*) can be communicated to the public through various channels, including websites, social media, banners, leaflets, and direct contact via personal phone numbers or email addresses. Additional outreach efforts may involve organizing engaging events such as free medical check-ups, fun bike rides, and door prize giveaways for active participants (Nugraheni et al., 2022)

Risk factor data collection is the initial step in non-communicable disease (NCD) surveillance. Its primary goal is to identify at-risk groups affected by key risk factors (Ditjen Pencegahan dan Pengendalian Penyakit, 2020). Incomplete data collection leads to gaps in information about the prevalence of risk factors in a given region, which in turn affects the effectiveness of prevention strategies. Therefore, it is essential to enhance health workers' understanding of data quality through targeted training and workshops to refresh their knowledge and skills in NCD risk factor surveillance.

2. Data Processing, Analysis, and Interpretation

Processing and analyzing risk factor data is the second step in non-communicable disease (NCD) risk factor surveillance. Data processing prepares the collected information for analysis, while data analysis aims to identify variables that describe health problems in terms of person, place, and time. Data interpretation involves assigning meaning and significance to the results of the analysis. (Noor, 2022). Once the data is entered, the processing stage begins. In Padang, the *Posbindu* risk factor data was processed using the Asik application developed by the Ministry of Health. The data was then analyzed descriptively based on person, time, and place variables, and the results were presented in tables and diagrams.

Data processing and analysis are carried out automatically using the Ministry of Health's Asik information system and application. The Asik (Sehat Indonesiaku) application was developed by the Ministry of Health of the Republic of Indonesia to support the recording and monitoring of public health services, particularly within primary health care facilities such as integrated health posts (*Posyandu*), non-communicable disease health posts (*Posbindu*), and community health centers. This information system–based NCD surveillance tool, available as both an online and mobile application, enhances the efficiency of data collection, analysis, and reporting (Rahajeng & Wahidin, 2020). It enables health workers and community cadres to input data in real time, generating graphical and tabular reports that support preventive decision-making by policymakers (Kevina Shahla et al., 2025).

The interpretation of risk factor data aims to present information in a clear and systematic manner. In this study, data interpretation was conducted descriptively using person variables such as age, gender, education, and occupation. The place variable referred to the location where NCD risk factors were identified, based on the health center's coverage area. The time variable represented when the health issue occurred, indicating the presence of a risk factor. The data was presented in narrative form, as well as through tables and graphs (Kementerian Kesehatan RI, 2015).

The results of this study align with findings from Surabaya, where data interpretation was presented through graphs and tables. This approach helped health officers better understand trends and patterns in the incidence of non-communicable diseases (NCDs) and their associated risk factors. Over the past three years, data has shown an upward trend in the number of individuals exhibiting NCD risk factors—such as smoking, physical inactivity, low fruit and vegetable consumption, and high body mass index (BMI). This increase highlights the urgent need to strengthen prevention and control efforts for NCDs (Rahmayanti et al., 2017). In contrast, research conducted in Majalengka found that data interpretation was performed only descriptively and narratively, without integrating it with other datasets (Syadidurrahmah et al., 2021). This limitation was attributed to a shortage of human resources and the additional workload faced by community health center staff, many of whom manage multiple programs or hold dual roles. Other studies also confirm that program officers at community health centers often juggle multiple responsibilities, leading to divided attention and limited time for effective program implementation, including data analysis (Rimonda et al., 2024).

Data obtained through collection, analysis, and interpretation enables the identification of high-risk groups and the monitoring of trends, thereby supporting the planning of

appropriate and effective interventions. Risk factor surveillance serves as a critical foundation for the sustainable control and reduction of the non-communicable disease burden.

3. Information Dissemination

Data dissemination provides clear and actionable information to guide policy decisions aimed at controlling health problems. In this study, risk factor information was shared through mini-workshops; however, not all stakeholders were involved, leading to uneven access to the information. The purpose of dissemination is to offer feedback to health cadres and the community regarding the results of activities conducted at the Integrated Health Post (*Posbindu*).

The Community Health Center disseminates information to health cadres and the community through outreach activities conducted during subsequent *Posbindu* implementations. Feedback from the City Health Office is provided to the Community Health Center, which then shares it with cadres and the community (Rahmayanti et al., 2017). The dissemination of risk factor surveillance data follows a staged process: the Community Health Center first compiles and reports the data to the City Health Office. Reports are submitted via WhatsApp, and the Health Office responds through the same platform with a summary report that includes the number of identified cases (Nugraheni et al., 2022).

According to the concept of information dissemination, the results of risk factor surveillance are most beneficial when shared with the community and relevant agencies. Dissemination can target health officials, non-governmental organizations (NGOs), professionals, academic institutions, and the general public. The process is typically carried out in stages, beginning at the Integrated Health Post, followed by the Community Health Center, and ultimately reaching the City Health Office. Information may be shared through reports or seminars, enabling stakeholders to understand regional risk factors and plan appropriate follow-up actions based on surveillance findings (Amiruddin R, 2017). To ensure surveillance activities have maximum impact, it is essential to design a dissemination strategy that clearly identifies the target audience and the media channels used to reach users of risk factor surveillance data.

4. Follow-up

Follow-up is the final stage of surveillance activities. Analyzed surveillance data, once disseminated to stakeholders, serves as the foundation for decision-making in the design of effective non-communicable disease (NCD) prevention and control programs tailored to the specific needs of the local community(Ditjen Pencegahan dan Pengendalian Penyakit, 2020). Follow-up efforts may include a range of prevention strategies, such as communication,

information dissemination, education, and counseling at *Posbindu* (Community Health Posts) and within the broader community. Additionally, individuals identified as having high-risk factors or existing NCDs may be referred for further medical evaluation and care.

Interviews revealed that follow-up in the prevention program includes counseling provided during visits to the Integrated Health Post (*Posbindu*) for risk factor assessment. Follow-up is conducted when risk factors are identified in individuals undergoing screening for non-communicable diseases. Monitoring and evaluation are carried out by the City Health Office through technical guidance conducted on a trimester and annual basis. Similar to findings from research in Wonogiri, supervision, monitoring, and evaluation of health center personnel are conducted by the Health Office through regular visits—monthly, trimester, semester, and annually (Latar, 2024).

The follow-up stage of risk factor surveillance is critical to ensuring that the data and information collected are effectively applied in the prevention and control of diseases, particularly non-communicable diseases (NCDs). At this stage, surveillance findings are utilized to plan, develop, and evaluate targeted intervention programs based on the identification of risk factors and high-risk population groups. Timely and appropriate follow-up enables early detection of health issues and facilitates rapid response by relevant stakeholders, thereby enhancing the effectiveness of the surveillance system in delivering actionable recommendations and early warnings to prevent the onset or progression of disease. Moreover, follow-up activities contribute to the monitoring and evaluation of prevention program outcomes and support the continuous refinement of intervention strategies.

CONCLUSION

The findings of this study underscore the importance of systematic and continuous implementation of non-communicable disease (NCD) risk factor surveillance. This process, encompassing data collection, processing, analysis, interpretation, dissemination, and follow-up, is essential for effective disease prevention and control. A key challenge identified is the absence of direct data entry into the Asik application, which limits the availability of real-time data. Real-time data is vital for timely decision-making and responsive action. Additionally, data analysis has not been integrated with other relevant factors, and data interpretation remains suboptimal. While information is disseminated to stakeholders, not all are actively involved, and follow-up actions using surveillance data are inconsistently applied in planning NCD prevention programs. This study highlights the need to enhance the quality and utilization of community-based surveillance data, strengthen stakeholder engagement, evaluate intervention

effectiveness, and assess the impact of surveillance applications on data processing and ongoing monitoring of NCD risk factors.

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