Research Square

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Emergency Department Intervention and Referral for Homeless Individuals: Reducing Revisits

Kyungseok Park
Seoul Metropolitan Government–Seoul National University Boramae Medical Center
Jonghwan Shin
skyshiner@naver.com
Seoul Metropolitan Government–Seoul National University Boramae Medical Center
Won Mo Jang
Seoul Metropolitan Government–Seoul National University Boramae Medical Center
Tae Han Kim
Seoul Metropolitan Government–Seoul National University Boramae Medical Center
Hui Jai Lee
Seoul Metropolitan Government–Seoul National University Boramae Medical Center
Jin Hee Jung
Seoul Metropolitan Government–Seoul National University Boramae Medical Center
Jung Ho Shin
Seoul Metropolitan Government–Seoul National University Boramae Medical Center
Kyoung Jun Song
Seoul Metropolitan Government–Seoul National University Boramae Medical Center

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Abstract

Background

This study evaluated the effectiveness of an emergency department (ED)-based Screening, Brief Intervention, and Referral to Treatment (SBIRT) program for homeless individuals in reducing ED revisits and explored factors associated with recurrent ED utilization.

Methods

We performed a retrospective observational study of homeless patients who visited the ED of a public hospital in Seoul, South Korea, between January 2015 and December 2022. The program included screening, brief interventions, and referrals by ED-based social workers to services addressing social determinants of health (SDoH) such as housing and financial insecurity. The primary outcomes were ED revisits within 48 hours, 7 days, and 30 days after discharge. Multivariable logistic regression identified factors associated with revisits.

Results

Of 3,179 homeless patients, 1,281 (40.3%) were screened, 979 (30.8%) received brief interventions, and 556 (18.2%) were referred to services addressing SDoH. Among 2,394 discharged patients, those referred to services had significantly fewer ED revisits at 48 hours (13.8% vs. 23.8%; *P* = 0.009) and 7 days (28.3% vs. 41.5%; *P* = 0.003), but not at 30 days (46.2% vs. 54.6%; *P* = 0.068). Recent ED use was the strongest factor associated with revisits across all time points.

Conclusion

An ED-based SBIRT program was associated with reduced short-term ED revisits among homeless individuals, particularly those with prior ED visits. These findings highlight the potential of targeted social interventions within emergency care to improve outcomes for underserved populations.

1. Background

Stable housing is a critical component of the social determinants of health (SDoH) [1, 2]. Homeless individuals experience disproportionately high rates of chronic illnesses, infectious diseases, trauma, and mental health disorders compared to the general population, resulting in significantly increased rates of preventable mortality [3–7].

Homeless individuals frequently present to emergency departments (EDs) following referrals from bystanders, police officers, or emergency medical service (EMS) personnel due to unpredictable or acute events [8]. These patients often face significant barriers to accessing healthcare and demonstrate low adherence to follow-up with primary care providers, resulting in frequent ED visits and high frequency of short-term revisits [7, 9–11]. Even after receiving medical treatment, many continue to experience unresolved social challenges, including housing insecurity and economic instability [12–14]. As a result, EDs function not only as providers of acute medical care but also as essential safety nets that address the broader SDoH affecting homeless populations.

In South Korea, homeless individuals are eligible for medical expense support through governmental or municipal programs. Despite this, the majority of their medical care is provided at public hospitals, particularly in EDs. In Seoul, five public hospitals have implemented the “Seoul-Type Citizen Sympathy Emergency Room Project,” a program designed to support vulnerable populations [8]. This initiative is based on the Screening, Brief Intervention, and Referral to Treatment (SBIRT) framework [15], providing a continuum of services that includes emergency medical care,

comprehensive counseling, and referral to resources addressing SDoH. Within this program, social workers are integrated into EDs to identify vulnerable patients and deliver individualized interventions. These interventions include referrals to public agencies, homeless shelters, substance use treatment centers, and other relevant services designed to address urgent needs such as housing instability, economic hardship, and food insecurity.

While several studies have investigated interventions for homeless individuals, such as case management and housing support [11, 13, 16], there remains a notable gap in research regarding the quantitative outcomes of ED-based SBIRT programs. In particular, the effect of these programs on reducing ED revisits among homeless individuals has not been thoroughly examined. The present study seeks to address this gap by evaluating the effectiveness of an ED-based SBIRT program for homeless individuals. Specifically, it aims to assess the program's impact on reducing ED revisits and to identify factors associated with recurrent ED utilization within this population.

2. Methods

"Seoul-Type Citizen Sympathy Emergency Room Program" [8]

This study describes an SBIRT program implemented in the EDs of five public hospitals in Seoul, South Korea. Dedicated social workers are integrated into the ED to identify vulnerable patients and deliver targeted interventions, including in-depth counseling and referrals to services addressing SDoH. The program primarily serves homeless individuals, socially isolated elderly persons, and patients with alcohol or other substance use disorders or mental illnesses, who commonly present with crises requiring both medical and social interventions. Patients are screened using the Electronic Medical Record (EMR) system, and interventions are initiated either through case identification by social workers or upon requests from physicians or nurses. Once a patient's social needs are identified, social workers coordinate appropriate referrals to services addressing SDoH. These may include assistance with medical expenses, arrangements for public ambulance transportation upon discharge, and support with housing, meal provision, case management, and caregiving services through partnerships with external organizations. Patients are often referred to public institutions such as community centers or homeless shelters to access these resources. In addition to these referrals, the program offers administrative support within the ED, such as locating legal guardians when necessary. Each participating institution employs one or two social workers who work during regular weekday hours. While most interventions and referrals occur during these hours, patients who visit the ED outside of working hours are also screened, and their information is recorded for follow-up during the next available shift. Launched in 2014, the program has been continuously operating through 2025, demonstrating a sustained commitment to addressing the complex social needs of vulnerable populations within the emergency care setting.

2.1. Study Population

Homeless patients were defined according to the relevant Korean regulations [17, 18].

Category 1 – All of the following criteria must be met:

1. A person without a fixed residence
2. A person transported to the hospital by administrative agencies (e.g., police, fire department emergency medical service)
3. A person confirmed as an emergency patient by a physician's certificate
4. A person without a legal guardian or whose legal guardian is unable to provide support

Category 2 – At least one of the following criteria must be met:

1. Medical Aid Type 1 Homeless: Individuals who have resided in temporary protection facilities or self-support facilities for the homeless for at least three consecutive months, who are not enrolled in the National Health Insurance program or have been delinquent in their payments for more than six months, or street homeless individuals who receive weekly counseling from the director of the Homeless Comprehensive Support Center.
2. Patients who visit with a referral issued by free clinics or welfare facilities for the homeless, as stipulated under the Homeless Welfare Act.

All homeless patients who presented to the study ED between January 2015 and December 2022 were included in the analysis. Patients younger than 18 years or those whose identities could not be verified at the time of discharge were excluded. To ensure accurate identification of repeat ED visits by the same individual, ED visit records from one month prior to and one month following the study period were also reviewed. For patients with multiple visits within this timeframe, clinical data were collected for each visit.

2.2. Data Collection and Variables

Demographic information of the study patients from a single public hospital was collected through the EMR system and social workers' dedicated registries. Variables included demographic and socioeconomic status (age, sex, health insurance status, registration as homeless), means of ED transport, ED visit time, Korean Triage and Acuity Scale (KTAS) [19], level of consciousness on arrival, chief complaint, ED disposition and ED length of stay (LOS). In addition, the number of ED visits in the preceding 30 days was collected as a key adjustment variable in the multivariable logistic regression analysis, given its known association with ED revisits among homeless individuals [20]. The primary outcome was ED revisits at 48 hours, 7 days, and 30 days.

2.3. Statistical Analysis

Categorical variables were presented as proportions, and continuous variables were expressed using the medians and interquartile range (IQR). A chi-square test or Fisher's exact test was used for categorical variables to compare between-group differences. Multivariable logistic regression analysis was performed to identify factors associated with 48-hour, 7-day, and 30-day ED revisits. Data analysis was conducted using STATA/SE, version 19.0 (StataCorp LLC). A two-tailed $P < 0.05$ was considered significant.

3. Results

3.1. Characteristics of Study Subjects

During the study period, a total of 3,179 homeless patients presented to the ED. Of these, 1,281 (40.3%) were screened by social workers, 979 (30.8%) received interventions, and 556 (18.2%) were referred to appropriate services (Fig. 1). Patient characteristics based on intervention status and referral to services are summarized and compared in Table 1. The majority of patients were male (n = 3,061; 96.3%), with a median age of 54 years (IQR: 47–59 years). The number of homeless patients presenting to the ED declined after 2020, likely reflecting the impact of the COVID-19 pandemic (Supplement Table 1) [21]. A greater proportion of patients in the intervention group were triaged as less urgent or non-urgent compared to those who did not receive interventions (55.3% vs. 50.4%, $P < 0.001$). Similarly, patients in the referral group were more frequently triaged as less urgent or non-urgent than those who were not referred (56.7% vs. 50.9%, $P < 0.001$) (Table 1). Injuries and gastrointestinal complaints were the most common chief complaints among the study population (Supplement Table 2).

Table 1
Characteristics of the study populations

	Total, No.=3,179	Intervention (+), No.=979	Intervention (-), No.=2,200	*P*-value	Referral (+), No.=556	Referral (-), No.=2,623	*P*-value
	No. (%) or median (IQR)	No. (%) or median (IQR)	No. (%) or median (IQR)		No. (%) or median (IQR)	No. (%) or median (IQR)	
Age	54 (47–60)	54 (48–60)	53 (46–59)	0.005	55 (48–60)	54 (46–59)	0.002
Sex							
Male	3,061 (96.3)	947 (96.7)	2,114 (96.1)	0.38	538 (96.8)	2,523 (96.2)	0.51
Insurance type							
National health insurance	1,198 (37.7)	367 (37.5)	831 (37.8)	0.21	210 (37.8)	988 (37.7)	0.004
Medical aid	1,771 (55.7)	536 (54.7)	1,235 (56.1)		292 (52.5)	1,479 (56.4)	
No insurance	210 (6.6)	76 (7.8)	134 (6.1)		54 (9.7)	156 (5.9)	
Without a companion	2,778 (87.4)	905 (92.4)	1,873 (85.1)	< 0.001	522 (93.9)	2,256 (86.0)	< 0.001
Ambulance use	2,389 (75.1)	789 (80.6)	1,600 (72.7)	< 0.001	455 (81.8)	1,934 (73.7)	< 0.001
Drunken	906 (28.5)	299 (30.5)	607 (27.6)	0.089	160 (28.8)	746 (28.4)	0.87
Altered mental status	674 (21.2)	206 (21.0)	468 (21.3)	0.88	105 (18.9)	569 (21.7)	0.14
Korean Triage Severity Scale (KTAS)							
1–2 (Resuscitation / Emergent)	344 (10.8)	79 (8.1)	265 (12.0)	< 0.001	48 (8.6)	296 (11.3)	< 0.001
3 (Urgent)	652 (20.5)	228 (23.3)	424 (19.3)		143 (25.7)	509 (19.4)	
4–5 (Less or non-urgent)	1,650 (51.9)	541 (55.3)	1,109 (50.4)		315 (56.7)	1,335 (50.9)	
N/A	533 (16.8)	131 (13.4)	402 (18.3)		50 (9.0)	483 (18.4)	
ED visit in the preceding 30 days				0.20			0.61
0	2,267 (71.3)	676 (69.1)	1,591 (72.3)		384 (69.1)	1,883 (71.8)	
1	483 (15.2)	153 (15.6)	330 (15.0)		93 (16.7)	390 (14.9)	
2	158 (5.0)	55 (5.6)	103 (4.7)		30 (5.4)	128 (4.9)	
3 or more	271 (8.5)	95 (9.7)	176 (8.0)		49 (8.8)	222 (8.5)	
ED disposition							

	Total, No.=3,179	Intervention (+), No.=979	Intervention (-), No.=2,200	*P*-value	Referral (+), No.=556	Referral (-), No.=2,623	*P*-value
	No. (%) or median (IQR)	No. (%) or median (IQR)	No. (%) or median (IQR)		No. (%) or median (IQR)	No. (%) or median (IQR)	
Admission	684 (21.5)	206 (21.0)	478 (21.7)	0.11	116 (20.9)	568 (21.7)	< 0.001
Transfer	77 (2.4)	34 (3.5)	43 (2.0)		30 (5.4)	47 (1.8)	
Discharge	2,394 (75.3)	733 (74.9)	1,661 (75.5)		407 (73.2)	1,987 (75.8)	
Death in ED	2 (0.1)	1 (0.1)	1 (0.0)		1 (0.2)	1 (0.0)	
N/A	22 (0.7)	5 (0.5)	17 (0.8)		2 (0.4)	20 (0.8)	
DAMA / Eloped	232 (7.3)	68 (6.9)	164 (7.5)	0.61	32 (5.8)	200 (7.6)	0.12
ICU admission	93 (2.9)	14 (1.4)	79 (3.6)	< 0.001	4 (0.7)	89 (3.4)	< 0.001
In hospital morality	49 (1.5)	13 (1.3)	36 (1.6)	0.51	5 (0.9)	44 (1.7)	0.18
ED LOS	382 (204–667)	502 (273–940)	331 (183–568)	< 0.001	512 (272–1040)	355 (192–613)	< 0.001

Table 2
Analysis of ED revisits among discharged homeless patients

		Visited the ED in preceding 30 days				Not visited the ED in preceding 30 days			
	Total, No.=2,394	Subtotal, No.=788	Referred, No.=145	Not referred, No.=643	*P*-value	Subtotal, No.=1,606	Referred, No.=262	Not referred, No.=1,344	*P*-value
	No. (%)	No. (%)	No. (%)	No. (%)		No. (%)	No. (%)	No. (%)	
48-hour revisit	282 (11.8)	173 (22.0)	20 (13.8)	153 (23.8)	0.009	109 (6.8)	16 (6.1)	93 (6.9)	0.63
7-day revisit	500 (20.9)	308 (39.1)	41 (28.3)	267 (41.5)	0.003	192 (12.0)	28 (10.7)	164 (12.2)	0.49
30-day revisit	752 (31.4)	418 (53.0)	67 (46.2)	351 (54.6)	0.068	334 (20.8)	50 (19.1)	284 (21.1)	0.46

3.2. Main Results

A total of 2,394 patients who were discharged following ED management were included in the final analysis, as evaluating the effectiveness of ED interventions was deemed inappropriate for patients who were admitted or transferred. The primary outcome was whether patients returned to the study ED within 30 days (Table 2). Among patients with a prior ED visit within the previous 30 days, referral to services addressing SDoH was associated with a significant reduction in 48-hour revisits (13.8% vs. 23.8%, $P = 0.009$) and 7-day revisits (28.3% vs. 41.5%, $P = 0.003$), but not in 30-day revisits (46.2% vs. 54.6%, $P = 0.068$). In contrast, among patients without a prior ED visit within 30 days, referral to services was not significantly associated with differences in revisit proportions.

In multivariable logistic regression analyses examining factors associated with ED revisits (Table 3), a higher number of ED visits in the preceding 30 days was significantly associated with higher odds of 48-hour, 7-day, and 30-day revisits. Additionally, referral to services through the SBIRT program was associated with reduced likelihood of 48-hour and 7-day revisits. However, SBIRT referral was not significantly related to a reduction in 30-day revisits.

Table 3
Logistic regression analysis for associated factors with ED revisit among discharged homeless patients

	Adjusted OR	**95% CI**	***P*-value**
48-hour ED revisit			
Age (per 1-year increase)	0.99	0.98-1.00	0.027
Korean Triage Severity Scale 4–5 (vs. 1–3)	1.39	1.03–1.87	0.031
ED visits in the preceding 30 days			
0	(Reference)		
1	2.58	1.83–3.64	< 0.001
2	5.10	3.29–7.90	< 0.001
3 or more	6.93	4.89–9.82	< 0.001
SBIRT program (Non-referral vs. referral group)	1.49	1.04–2.15	0.030
7-day ED revisit			
Age (per 1-year increase)	0.99	0.98-1.00	0.017
Korean Triage Severity Scale 4–5 (vs. 1–3)	1.26	0.99–1.56	0.059
ED visits in the preceding 30 days			
0	(Reference)		
1	2.55	1.93–3.37	< 0.001
2	5.01	3.42–7.35	< 0.001
3 or more	12.61	9.22–17.25	< 0.001
SBIRT program (Non-referral vs. referral group)	1.38	1.03–1.84	0.030
30-day ED revisit			
Age (per 1-year increase)	1.00	0.99–1.01	0.914
Korean Triage Severity Scale 4–5 (vs. 1–3)	1.05	0.84–1.33	0.649
ED visits in the preceding 30 days			
0	(Reference)		
1	2.21	1.70–2.87	< 0.001
2	4.53	3.09–6.65	< 0.001
3 or more	12.08	8.52–17.11	< 0.001
SBIRT program (Non-referral vs. referral group)	1.27	0.97–1.67	0.080

4. Discussion

In this study, the implementation of an ED-based SBIRT program was associated with a significant reduction in short-term ED revisits among individuals experiencing homelessness. To our knowledge, this is the first investigation to demonstrate the impact of an ED-based intervention on reducing ED revisits within the homeless population [11]. While patients in the intervention and referral groups exhibited lower clinical acuity, they made greater use of social resources—including longer ED LOS—than their respective control groups. Nevertheless, the observed reduction in short-term revisits following social worker intervention and referral represents a meaningful outcome, especially considering the heightened vulnerability of this population.

Across the 48-hour, 7-day, and 30-day revisit intervals, the number of ED visits in the preceding 30 days was the most consistent and robust factor associated with revisits. After adjusting for age, clinical acuity, and recent ED utilization, participation in the SBIRT program remained significantly associated with reduced 48-hour and 7-day revisits; though this association did not extend to 30-day revisits. Notably, the effect of the intervention was observed exclusively among patients with a history of recent ED visits. This finding suggests that this subgroup may consist largely of sporadic users presenting for transient, incidental events (e.g., acute trauma) or individuals transported from outside the hospital's catchment area. Consequently, their inherently low baseline probability of revisiting limits the observable impact of the intervention. These findings suggest that the SBIRT program may be particularly effective for chronically underserved who frequently utilize emergency services.

Homeless individuals frequently rely on the ED as their primary or sole source of healthcare, presenting at significantly higher rates than housed individuals [9, 22]. This pattern places substantial strain on ED resources and is associated with poorer clinical outcomes [4, 24]. Frequent ED utilization among homeless patients is often driven by poor adherence to treatment plan, limited access to primary care, and low rates of outpatient follow-up—factors that are frequently downstream effects of unmet social needs such as unstable housing, food insecurity, and financial hardship [3, 14]. Addressing these SDoH is critical to improving health outcomes in this population. However, the ED environment is inherently limited in its capacity to address complex social challenges due to factors such as overcrowding, unpredictability, and limited staffing. As a result, clinicians may find it challenging to conduct thorough social needs assessments or provide support beyond immediate medical treatment. These barriers highlight the importance of integrating dedicated ED-based social workers who can help bridge the gap between the healthcare system and social services, ultimately supporting more holistic and effective care for individuals experiencing homelessness [25].

A randomized controlled trial conducted at Toronto’s Wellesley Hospital demonstrated that even non-professional volunteers providing compassionate care—without formal medical or institutional interventions—were able to reduce ED revisits among homeless patients [16]. These findings underscore the critical role that patient satisfaction and perceived empathy play in influencing healthcare utilization. However, our program’s inability to achieve sustained reductions in long-term revisits may paradoxically highlight its limitations in addressing underlying chronic medical conditions or broader structural determinants of health. These results suggest that to achieve more durable outcomes, it is necessary to further enhance the quality of services and expand the scope of the program. Based on our findings, we recommend the nationwide implementation of ED-based intervention programs, accompanied by expanded hours of operation—ideally including 24/7 availability. These measures would enhance support for individuals experiencing homelessness and help decrease preventable ED revisits.

4.1. Limitation

This study has several limitations. First, although the dataset included multiple visits by the same individuals, our statistical analysis treated each visit as an independent observation. This approach does not account for within-subject

correlations or the potential carry-over effects of interventions, where a referral provided during an initial visit might influence outcomes in subsequent visits. However, we assumed that the protective effect of these acute interventions is likely time-limited, implying that a referral provided at an initial visit would have a negligible influence on later presentations. Second, its single-center, retrospective design limited our ability to capture ED revisits to other hospitals, potentially leading to an underestimation of the true revisit proportion. Third, the absence of an appropriate control group restricted our capacity to robustly evaluate the impact of referrals. Fourth, ED revisits, as defined in this study, may not uniformly reflect adverse outcomes [23]. While revisits are often considered undesirable from administrative and resource utilization perspectives, some may be clinically appropriate or necessary. We were unable to assess the clinical appropriateness of each revisit, which limits our ability to interpret revisits as a purely negative outcome. Additionally, the referral services provided by social workers varied widely in both type and scope, including referrals to shelters, financial assistance programs, meal services, and other community-based resources. In some cases, it was unclear whether patients ultimately accessed or benefited from the referred services. This variability and the lack of data on service uptake weaken the strength of our conclusions regarding the relationship between SBIRT program referrals and ED utilization outcomes.

5. Conclusion

In summary, this study provides quantitative evidence that an ED-based SBIRT program is associated with reduced short-term revisits among homeless individuals, particularly frequent users. While the impact on long-term outcomes was limited, the program's capacity to address immediate social needs highlights the value of integrated care models. Future initiatives should expand the scope of SDoH interventions to achieve sustained health improvements for this vulnerable population.

Abbreviations

ED: Emergency department

SBIRT: Screening, Brief Intervention, and Referral to Treatment

SDoH: Social determinants of health

EMS: Emergency medical service

EMR: Electronic Medical Record

KTAS: Korean Triage and Acuity Scale

LOS: Length of stay

IQR: interquartile range

N/A: not available

DAMA: Discharge against medical advice

ICU: Intensive care unit

OR: Odds ratio

CI: Confidence interval

Declarations

7.1. Ethics approval and consent to participate

The research was conducted according to the guidelines of the Declaration of Helsinki and was approved by the Institutional Review Board of Seoul Metropolitan Government–Seoul National University Boramae Medical Center (IRB No. 30-2023-59). The requirement for informed consent from patients was waived given the retrospective design of the study.

7.2. Consent for publication

Not applicable.

7.3. Availability of data and materials

The datasets analysed during the current study are not publicly available, but can be requested from the corresponding author upon reasonable request

7.4. Competing interests

The authors declare that they have no competing interests

7.5. Funding

Not applicable.

7.6. Author's contributions

KP, JS, THK, HJL, JHJ, JHS, and KJS contributed to data collection and interpretation. KP and JS performed the statistical analysis. JS and WMJ reviewed the manuscript. JS supervised the study. KP drafted the manuscript. All authors critically revised the manuscript and approved the final version. JS takes responsibility for the manuscript as a whole.

7.7. Acknowledgements

Not applicable.

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Figures

Figure 1. Process of study enrollment

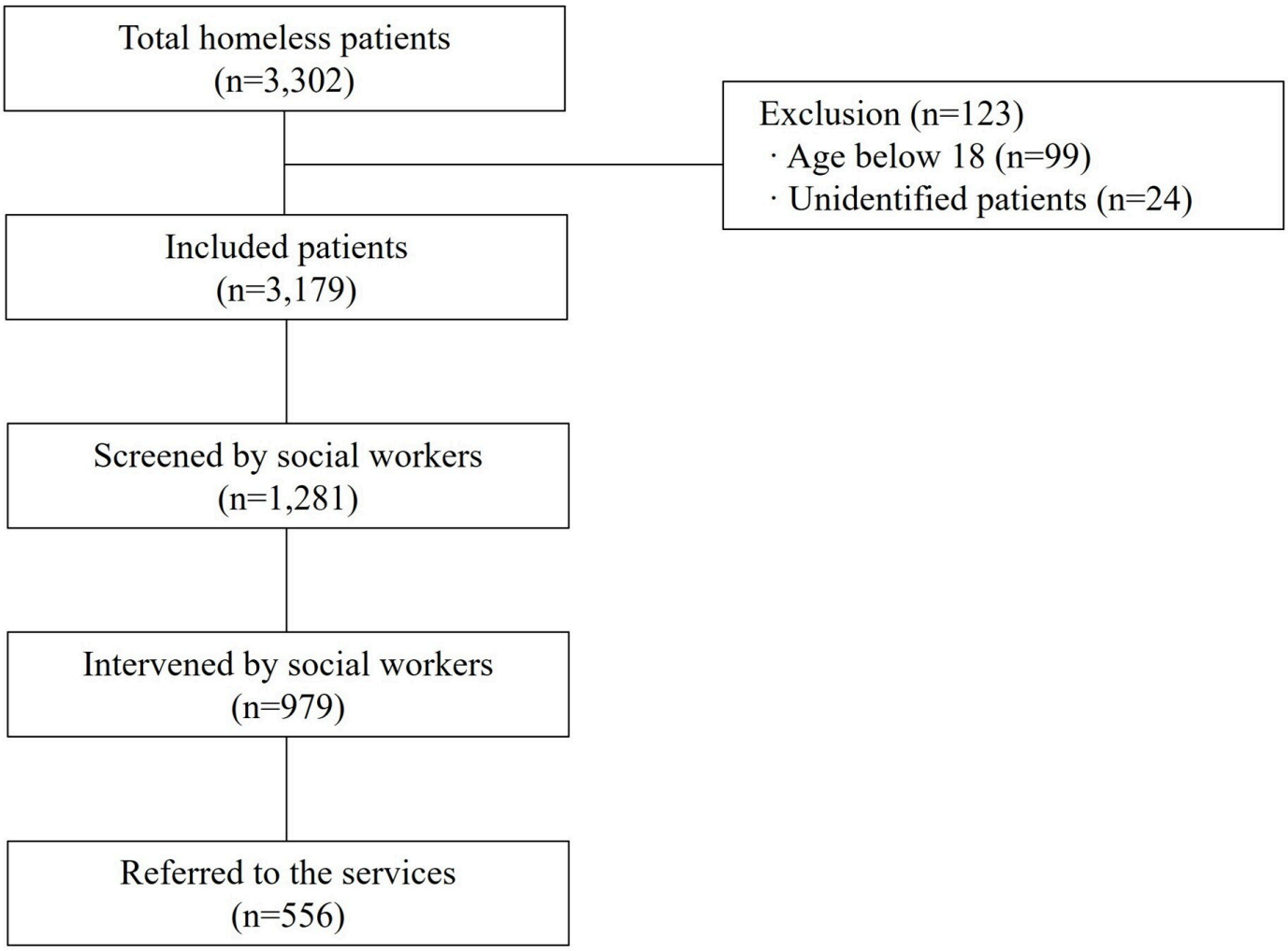


Figure 1

Process of study enrollment.

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