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Table 1 correct
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Original Article

The Environmental Cleanliness and Clutter Scale (ECCS) in the management of sanitary risks in dwellings of hoarders in North Italy

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Received: 14 February 2020 / Accepted: 19 November 2020

Abstract

The aims of this work were to apply the Environmental Cleanliness and Clutter Scale (ECCS) in order to assess domestic squalor in dwellings of hoarders, prevent sanitary risks, and intervene in solving the problem.

Methods

The ECCS is a domestic squalor scale, developed as a quantitative descriptive tool, based on ten items and a four-point scale. ECCS was applied in addition to the usual procedure during 40 site inspections in Milan, in two different surveys of dwellings of hoarders (2016 and 2019). A correction only for companion animal hoarders was introduced.

Results

In the first investigation, which included animal accumulation, our 20 raters reported six cases of mild squalor and six and eight respectively of moderate and severe squalor. After our correction for animal hoarders' dwellings, we identified six cases of mild, four of moderate, and ten of severe squalor. In the second part of our assessment involving another 20 home visits, object hoarding only was assessed in order to evaluate the reliability of the ECCS method. We found varying total scores between the operators with different experience on this issue, but the same evaluation of the severity of the squalor in 14/15 (93%) cases therefore resulted in the same type of intervention.

Conclusion

The ECCS score made an evaluation of the severity of hoarding/squalor ~~possible~~, and supported the Local Health Protection Agency personnel in making decisions about timing and type of intervention.

Keywords

Hoarding
Squalor
Rating scale
Public health
Environmental hygiene

Supplementary information

The online version contains supplementary material available at https://doi.org/10.1007/s10389-020-01429-2.

Introduction

Anomalous behaviors regarding hoarding and domestic squalor have been mainly described and studied from a clinical point of view in association with various psychiatric conditions, but less from a public health point of view, in terms of when and how interventions are necessary to deal with unsanitary living conditions.

An abnormal difficulty of discarding objects such as papers, books, clothes, food, and even rubbish, can cause significant clutter and sanitary problems, which influence the quality of domestic environments and the function of these spaces. Hoarding can involve not only items of no value but also animals in the most severe cases, interfering with basic household activities and cleaning. Other hazards such as fires, structural failures in floors, and rodent and insect infestations can create significant risks not only for the home's occupants but also for persons living nearby (Frost et al. 2004, 2010; Lacombe and Cossette 2018; Mataix-Cols et al. 2013; Rasmussen et al. 2014; Scuri et al. 2018; Snowdon and Halliday 2009).

According to national and regional laws, the Local Health Protection Agency (LHPA) has the mandatory assignment, among others, to work in the field of the prevention and promotion of public health, promoting health education, veterinary public health, food, medical and veterinary safety, and controlling hygienic conditions in domestic and working environments. LHPA personnel frequently face hoarding and squalor in private dwellings in Milan in Northern Italy. Private citizens, administrators of buildings, or community services personnel can report object or animal hoarding, or severe domestic squalor, to the LHPA to remedy unsanitary conditions; however, up to now, the type and timing of interventions could differ from operator to operator. While the personnel appointed to this control

activity are all trained in a standardized procedure already in use, the assessment of the severity of squalor and the decision to intervene in one way rather than another has, up to now, proceeded in an arbitrary and subjective manner.

In 2009, Halliday and Snowdon developed a quantitative descriptive tool for assessing domestic squalor, the Environmental Cleanliness and Clutter Scale (ECCS), which rates ten items on a four-point scale. Hoarding severity was described in relation to accessibility and accumulation of objects, with hygienic condition ratings depending on the cleanliness of the rooms and presence of vermin (Halliday and Snowdon 2009).

The aim of this work was to apply the ECCS, for the first time in Milan, North Italy, in order to improve the assessment of squalor in dwellings of hoarders. We are conscious of the differences between hoarders and persons with mental disorders from a clinical point of view, but we chose not to consider their psychiatric conditions. We considered domestic squalor as a consequence of abnormal behavior, with or without a psychiatric diagnosis of the dwelling's inhabitant.

Another objective was to establish equivalent and adequate actions by the LHPA operators, with a second series of home visits being performed to evaluate the reliability of the ECCS method between two raters with different amounts of experience in this field.

Methods

Reports concerning object or animal accumulation, or domestic squalor, can be made by phone or e-mail to the LHPA, Metropolitan Area of Milan, in order to intervene in dwellings where hygienic conditions are critical.

The cases are recorded and assigned to an LHPA technician for the subsequent site visit, with the presence of community services personnel and veterinarians.

Surprise visits at the dwelling are often carried out, since the potential hoarder is commonly uncooperative, does not open the door or answer the phone, and avoids any relationship with neighbors.

After the visit, the LHPA technician prepares a series of administrative acts to ensure the complete hygienic restoration of the dwelling, but at present he or she can choose arbitrarily among times and ordinances of various severity, from a

request to reorganize the house autonomously to the intervention of personnel appointed by the Municipality of Milan and dedicated to removal, cleaning, and disinfection/disinfestation of the dwellings.

In addition to the usual procedure used by LHPA technicians during control inspections, the ECCS was also applied in two different surveys, the first in May–September 2016 and the second in May–September 2019. This scale is a quantitative tool, based on ten items, namely: accessibility, accumulation of items of little value, accumulation of garbage, cleanliness of floors and carpets, cleanliness of walls and surfaces, cleanliness of bathroom, cleanliness of kitchen and traces of food, odors, presence of vermin (e.g., rats, mice, cockroaches, flies, fleas) and cleanliness of sleeping area.

A four-point scale reflected the value of each item, namely 0 if clean/absence of degradation, 1 if mildly dirty/mild degradation, 2 if dirty/moderate degradation, and 3 if very dirty/severe degradation. The ECCS score is the total amount of the ten values.

After testing their method, Halliday and Snowdon set the scores that could be applied as the reference limits to distinguish mild (≤ 12) from moderate (13–17) and severe (18–30) squalor. The authors argued that intervention would be needed in cases of what they called moderate or severe squalor, whereas in mild cases this would not be necessary (Halliday and Snowdon 2009).

In light of the finding that not only object hoarding but also companion animal hoarding or both could be observed during inspections, only in the first campaign, we introduced a correction factor taking into account the number of animals and people/m^2. The obtained score was summed and rounded to the initial score derived from the ECCS method. The results from both approaches, the original and the corrected one, were compared.

The state of electrical, gas, heating, and air conditioning systems was checked. These data were not reported and do not contribute to the final score, but simply described dwelling conditions within the framework of the standard LHPA inspections.

In the second survey (May–September 2019), the reliability of the method was tested between two LHPA operators, one with decades of seniority and the other one being confronted with this kind of sanitary problems for the first time.

Results

In the period May–September 2016, a total of 71 reports were received by LHPA officers, and 20 home visits were carried out in Milan by two LHPA technicians.

The age of the 20 hosts ranged between 34 and 80 years old, and six were male (mean age 64 years) and 14 female (mean age 56 years). Twelve out of twenty cases (60%) were single, with the remaining subjects living with a family member or cohabitant in the apartment. Eleven cases (55%) had at least one animal (Table S-1).

According to the Halliday and Snowdon method, all operators together identified the severity of squalor with six mild, seven moderate, and seven severe cases of hoarding. However, the correction factor resulted in an increase in the initial values, highlighting the poor hygiene conditions when people accumulate excessive numbers of companion animals. Specifically, six mild, four moderate, and ten severe cases were then recognized because of the increasing severity due to the correction factor for companion animal hoarders (referred to as individuals 2, 12, and 13 in Table 1).

Table 1

Results of 20 dwelling inspections assessed by ECCS, with correction factor in italics, in the firs

AQ1

Site inspection category	1	2	3	4	5	6	7	8	9	10
Type of dwelling	pr	pu	pr	pr	pr	pu	pu	pr	pr	pr
Size of dwelling (square metres)	75	40	130	110	100	80	45	60	35	85
Inaccessible floor space in %	40	60	20	60	40	50	40	50	80	80
Reduced accessibility	1	2	0	2	1	1	1	1	2	2
Accumulation of items of little value	2	2	1	2	1	2	1	3	2	3
Accumulation of garbage	0	2	0	2	0	0	0	2	2	0
Floor and carpets cleanliness	2	2	2	2	1	1	2	2	3	3
Walls and surfaces cleanliness	1	1	2	2	1	1	2	1	3	1

pr: private property, pu: public property. Four-point scale for each item considered 0: clean/
dirty/moderate degradation, 3: very dirty/severe degradation. ECCS: MD: mild MO: modera

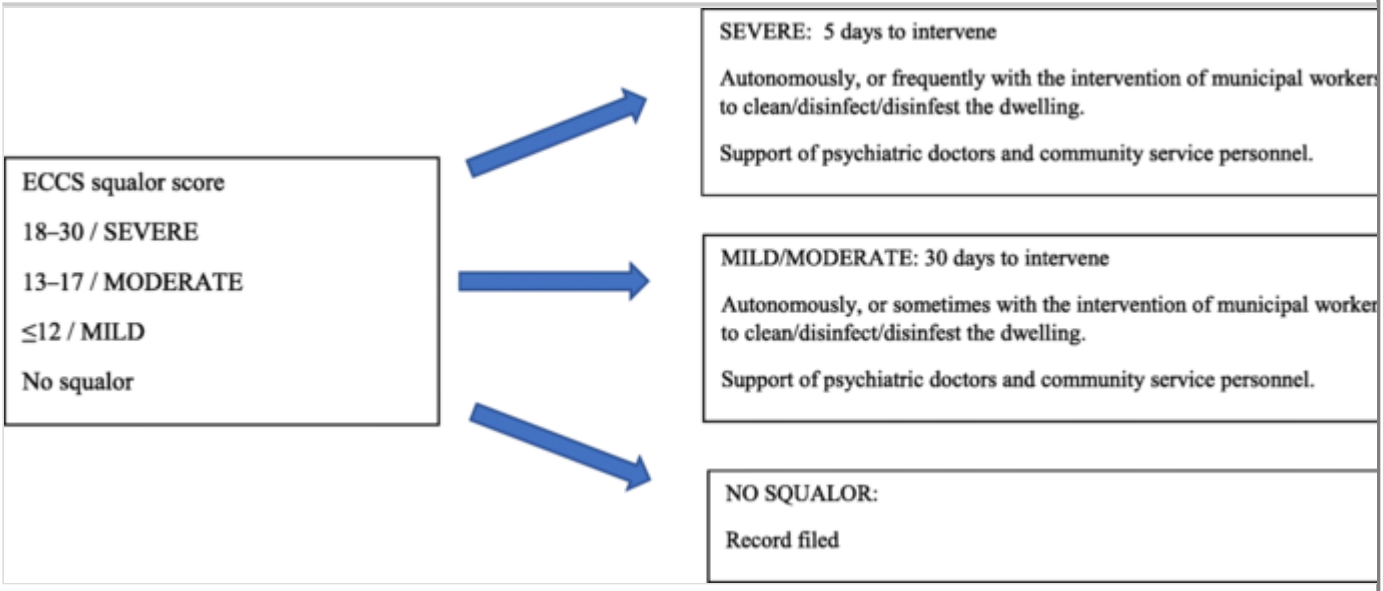
Site inspection category	1	2	3	4	5	6	7	8	9	10
Bathroom cleanliness	1	1	3	3	2	1	3	3	3	1
Kitchen cleanliness	1	2	2	3	1	1	2	1	3	1
Odors	2	2	2	2	1	1	2	3	3	0
Vermin	0	1	0	2	1	0	1	1	2	0
Sleeping area	1	1	1	1	2	1	2	2	2	1
ECCS initial score	11	16	13	21	11	9	16	19	25	12
Correction factor (no. of.animals + persons)/m^2	–	*4/40 =0.1*	–	–	–	–		*6/60 =0.1*	–	–
*Correction (no of animals + persons/m^2) * initial score*		*1.6*						*1.9*		
ECCS corrected score		*17.6*						*20.9*		
ECCS corrected and rounded score		*18*						*21*		
Initial severity of squalor	MD	MO	MO	SE	MD	MD	MO	SE	SE	MD
Severity of squalor after correction for animals		SE						SE		
Squalor severity trend after correction		↑						↔		
Action of cleaning, disinfection/disinfestation within 5 or 30 days	30	5	30	5	30	30	30	5	5	30

pr: private property, pu: public property. Four-point scale for each item considered 0: clean/
dirty/moderate degradation, 3: very dirty/severe degradation. ECCS: MD: mild MO: modera

Following each home visit in which critical conditions were identified, cleaning and disinfection/disinfestation were requested within 5 days (severe) up to 30 days (moderate), depending on the degree of squalor highlighted by the ECCS score (Fig. 1).

Fig. 1

Flow chart of actions after home visit as established by the working group agreement



In this period, actions could be done independently or supported by family and friends or community service and municipal personnel. All staff members were aware of the delicacy of the situation and collaborated in order to give support to the person and at the same time find a solution to the sanitary problems. Follow–up and supervision by community service personnel continued in the following months to prevent recurrence.

In the period May–September 2019, 20 home visits were performed by two LHPA operators, one of them a long-term experienced operator, and the other a new one with less experience in these sanitary problems. This enabled the reliability of the ECCS method between the two raters to be tested. In 5/20 inspections, ECCS score could not be evaluated at all, because of the resistance of the occupants to letting the apartment be visited by one or both operators. In the remaining 15 home visits, the total score calculated by one operator was rarely equal to the other one, but the assessment of the severity of squalor, being spread over a broader range of values, was the same in 14/15 cases (93%) (Table 2). Differences only occurred in case 2 and could be attributed to the lack of experience of operator 2.

Table 2

Test of reliability in the second round of home visits

Case number		Reduced accessibility	Accumulation of items of little value	Accumulation of garbage	Floor and carpets cleanliness	Walls ar surface cleanline

Case number		Reduced accessibility	Accumulation of items of little value	Accumulation of garbage	Floor and carpets cleanliness	Walls ar surface cleanline
1	Rater 1	2	3	2	3	2
	Rater 2	2	2	2	3	3
2	Rater 1	1	2	1	2	1
	Rater 2	1	3	2	2	2
3	*Rater 1*	*2*	*3*	*2*	*3*	*NE*
	Rater 2	*2*	*2*	*NE*	*3*	*3*
4	Rater 1	2	3	3	3	3
	Rater 2	2	2	2	3	3
5	Rater 1	1	2	2	3	2
	Rater 2	2	2	2	3	3
6	Rater 1	1	2	2	2	2
	Rater 2	2	2	1	1	2
7	Rater 1	3	3	3	3	3
	Rater 2	3	3	3	3	3
8	Rater 1	3	3	2	3	3
	Rater 2	2	2	2	2	3

Four-point scale for each item considered in ECCS Method: 0: clean/absence of degradation dirty/severe degradation, NE: not evaluable. ECCS: MD: mild, MO: moderate, SE: severe

In italics: incomplete/not evaluable home visit

Case number		Reduced accessibility	Accumulation of items of little value	Accumulation of garbage	Floor and carpets cleanliness	Walls ar surface cleanline
9	Rater 1	3	3	3	3	3
	Rater 2	3	3	3	3	3
10	Rater 1	1	2	1	1	1
	Rater 2	1	2	0	1	1
11	*Rater 1*	*1*	*3*	*2*	*2*	*2*
	Rater 2	*1*	*3*	*1*	*2*	*2*
12	*Rater 1*	*2*	*3*	*2*	*2*	*1*
	Rater 2	*2*	*3*	*2*	*2*	*2*
13	Rater 1	0	2	0	0	1
	Rater 2	0	1	0	0	1
14	*Rater 1*	*3*	*3*	*2*	*3*	*3*
	Rater 2	*2*	*3*	*2*	*3*	*3*
15	Rater 1	1	1	1	1	1
	Rater 2	1	1	0	0	1
16	Rater 1	1	2	2	1	1
	Rater 2	1	2	1	1	2

Four-point scale for each item considered in ECCS Method: 0: clean/absence of degradation dirty/severe degradation, NE: not evaluable. ECCS: MD: mild, MO: moderate, SE: severe

In italics: incomplete/not evaluable home visit

Case number		Reduced accessibility	Accumulation of items of little value	Accumulation of garbage	Floor and carpets cleanliness	Walls ar surface cleanline
17	Rater 1	1	2	3	3	2
	Rater 2	1	2	2	3	2
18	*Rater 1*	*3*	*2*	*2*	*3*	*2*
	Rater 2	*3*	*3*	*2*	*2*	*2*
19	Rater 1	1	3	2	3	2
	Rater 2	2	3	3	3	3
20	Rater 1	3	3	3	2	2
	Rater 2	2	3	2	2	2

Four-point scale for each item considered in ECCS Method: 0: clean/absence of degradation dirty/severe degradation, NE: not evaluable. ECCS: MD: mild, MO: moderate, SE: severe

In italics: incomplete/not evaluable home visit

Discussion

There is great concern about the conditions of persons living in squalor, and this alarm has increased in recent years, with the increasing attention of mass media, such as television and newspapers, on these issues.

Hoarding and severe domestic squalor are more common than expected around the world, even if reliable data about the prevalence and incidence of hoarding are still lacking. Samuels et al. reported that in 742 participants in an epidemiological study regarding personality disorders in the USA, the rate of hoarding was nearly 4% (5.3% weighted in the population). The frequency was higher in older people as opposed to younger people, and more common in men than in women, and was often associated with alcohol dependence, anxiety, depression, and mental issues such as obsessive–compulsive disorder. In these situations, it is common that dwellings are in critical sanitary conditions, and it is estimated that in about half of

the homes of people who hoard, the sink, tub, stovetop, or refrigerator are unusable, with one in ten homes not having a working toilet (Chater et al. 2013; Pertusa et al. 2010; Samuels et al. 2008).

We have no accurate data about the extent of hoarding and severe domestic squalor in Milan, but the LHPA receives hundreds of reports every year, and for each of them a home visit is necessary to verify domestic conditions.

In the absence of a unique and shared evaluation method, evaluations of the LHPA technical staff regarding the severity of hoarding and domestic squalor could be very diverse, with consequent different decisions regarding actions to be taken to limit sanitary risks. Therefore, a standardization of the surveillance and the way of acting is needed to improve the procedure already in use, and ECCS could constitute the ideal instrument to attain objectivity in the assessment of the severity of squalor and management of sanitary risks in dwellings. Against this backdrop, a working group with LHPA personnel and university researchers was established in order to study and manage cases, applying the ECCS method while adhering to internal regulations ~~(Local Hygiene Regulation 1994)~~ that impose standards of housing quality in Milan. The agreement which was created indicates various actions depending on the degree of hoarding/squalor. In severe cases with an evident public health risk it entails: first, a proposal for necessary and urgent action being forwarded to the Municipality of Milan for the complete cleaning and disinfection/disinfestation of the accommodation and the areas of relevance within 5 days; second, a notification to the company that manages the property in the case of public accommodation; and third, timely communication to other LHPA Services such as the Veterinary Department where hoarding of pet animals is involved. Recommended measures for mild and moderate hoarding/squalor are firstly the complete cleaning and disinfection/disinfestation of the accommodation and the areas of relevance within 30 days, secondly alerting the company that manages the property in the case of public accommodation, and thirdly informing of other LHPA Services such as the Veterinary Department, where there is pet hoarding. If there is no evidence of hoarding/squalor, the case is scheduled to be filed (Fig. 1).

Use of the ECCS method facilitates differentiation of mild from moderate and severe squalor in an unequivocal way. However, in such delicate situations, actions may depend on the collaboration of the hoarder who is then willing to clean up and/or disinfect, either autonomously or with the help of relatives, friends, staff of the community service, or private companies, and who then confirms the restoration of the dwelling to the LHPA and the Municipality through photographs. Otherwise,

if the time of re-establishment is too long or exceeds 30 days, there is the possibility of instigating a new home visit to support autonomous action, or the intervention of municipal workers to clean/disinfect/disinfest the dwelling, with the support of psychiatric doctors and community service personnel, and help the hoarder to remove superfluous objects.

In the first study, the occupants in cases 12 and 13 collaborated with LHPA technicians and veterinary staff, immediately relinquishing the animals, handing them over the veterinary service, and cleaning/disinfecting their home. Conversely, cases 15, 16, and 17 were opposed to removing objects and, above all, garbage, so the intervention of municipal personnel was necessary.

The assessment of severity of squalor between experienced and inexperienced operators was reasonably comparable, and therefore an indication of the very good reliability of the ECCS method.

As also observed by Halliday and Snowdon (Snowdon et al. 2007), some of our technicians were also hesitant mainly with regard to odors and their intensity in the first inspection, and about the extreme lack of cleanliness in case 2 of the second series of visits.

In conclusion, we can say that the ECCS method is a valid support tool for assessing the severity of hoarding/squalor, and that it can support LHPA personnel in taking decisions about interventions. Our correction to the original ECCS represents only one way of better describing squalor in companion animal hoarding. To the best of our knowledge, our study, even with its numerical limitation, represents the first application of the ECCS in managing sanitary risks in the case of hoarders in Italy, and particularly in Milan.

Publisher’s note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Acknowledgements

Thank you to all persons and relatives collaborating in our pilot study.
A special thanks to Professor John Snowdon for his comments and to Dr. Ettore Amato for his help with the English language revision of the manuscript.

Author’s contribution

Conceptualization: Marina Tesauro, Giovanni Armando Costa, Luciano Di Nunno; Methodology: Marina Tesauro, Michela Consonni, Iolanda Grappasonni, Stefania Scuri; Formal analysis and investigation: Marina Tesauro, Giovanni Armando Costa, Luciano Di Nunno, Giulia Sozzi, Michela Consonni; Writing — original draft preparation: Marina Tesauro Writing — review and editing: Marina Tesauro, Giorgio Ciconali, Michela Consonni, Iolanda Grappasonni, Stefania Scuri.

Compliance with ethical standards

This study concerns exclusively indoor environment quality. It did not include personal data of the dwelling's inhabitants and was therefore not submitted to any ethical committee.

Conflict of interest The authors declare that they have no conflict of interest.

All authors certify responsibility for the manuscript.

Supplementary Information

ESM 1 (DOC 53 kb)

ESM 2 (DOC 1838 kb)

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