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RESIDENTIAL SERVICES AS A MAJOR COST DRIVER IN MENTAL HEALTH AND SUBSTANCE USE SERVICES IN SOUTHERN FINLAND

ABSTRACT

Mental health and substance abuse services (MHS) have gone through major changes throughout Western countries. In searching for best practices, there is a need for benchmarking data on ways to allocate resources and organize services. In Finland, the closing of psychiatric hospitals during the last 50 years has partly led to transinstitutionalization to non-hospital residential services. We set out to study the provision of beds and personnel resources in non-hospital residential services in southern Finland, and whether the residential services' personnel resources and primary care orientation of services predict the total personnel costs of the MHS. We mapped the MHS with the European Service Mapping Schedule – Revised (ESMS-R). For the statistical analysis, we used the Spearman correlation and linear regression models. There were 333 non-hospital residential service beds per 100,000 adults and 119.5 full-time equivalent (FTE) personnel per 100,000 adults in the non-hospital residential services. The personnel resources in the hospital and non-hospital residential services were both significant predictors of total personnel costs. The association between non-hospital personnel and total personnel costs was not explained by sociodemographic indicators of the need for services. Of the personnel in the non-hospital residential services, 0.8% were physicians, 16.8% were nurses, 0.1% were psychologists, 0.6% were social workers and 82% were other professionals (mostly auxiliary nurses). Non-hospital residential services are a significant part of the MHS in Finland, and special attention should be paid to the coordination and the quality of care in these institutions.

KEY WORDS: DEINSTITUTIONALIZATION, MENTAL HEALTH CARE, HEALTH SERVICE RESEARCH, COMMUNITY CARE, HEALTH PERSONNEL, COSTS AND COST ANALYSIS

INTRODUCTION

Mental health is an essential component of health and well-being. Comprehensive, accessible and integrated mental health and social care services with effective leadership and governance are needed (1). The mental health services (MHS) are continuously changing. The downsizing and closing of large psychiatric hospitals—driven by ideological, humanitarian, legal and economic forces—have been the most common features seen in high-income countries, while investment in community outpatient services has been slow and uncoordinated (2,3). In Finland, the number of psychiatric hospital beds has decreased by 80% since 1970 (4).

Thus far in Finland, the deinstitutionalization process seems to have been successful, measured by mortality as a gross indicator: outpatient care-oriented services are related to lower suicide rates (5,6), and the life expectancy of people with a mental disorder has increased (7).

Internationally, a systematic review of cohort studies found no evidence of increased homelessness or imprisonment among patients discharged from psychiatric hospitals as a consequence of deinstitutionalization (8). However, alongside deinstitutionalization, in many European countries, a process of transinstitutionalization has been going on with an increasing number of beds in community-based residential services (9-13).

Modern, balanced mental healthcare services (MHS) include outpatient clinics, community mental health teams, acute inpatient care, community-based residential care and occupational services (3,14). Considerable variation exists in the provision and structure of mental health services between local areas in different countries (11,12,15,16) and even between sub-areas within the same country (17,18).

In Finland, municipalities are responsible for organizing the MHS and other healthcare and social services, funded by municipal taxes and partly by need-driven central governmental subsidies. MHS at the primary care level are arranged independently by municipalities, and the primary care outpatient services are provided mostly at health centres. Strengthening and developing the outpatient services, especially in the primary care setting, were recommended in the National Plan for Mental Health and Substance Abuse Work (19). The proliferation of primary care mental health services in Finland, however, has not been coordinated, and a large variation in resources exists between municipalities, leading to unequal access to low-threshold mental health services (20).

To provide specialized healthcare (both secondary and tertiary), the Finnish municipalities form joint municipal hospital districts. Some larger cities provide their own specialized mental

health services. Substance abuse services are mostly provided in the social sector, although the integration of mental health and substance abuse services has been in progress. In this article, the MHS also includes substance abuse services.

For patients with long-term debilitating conditions, municipalities most often purchase non-hospital residential services from private companies and third-sector providers on a fee-for-service basis (13,21). Since the vast majority of Finnish municipalities are small, the fragmentation of the MHS at the municipal level may lead to inefficiency and uncoordinated proliferation of non-hospital residential care and primary care MHS (13,20,21). In our previous study, we have found that the personnel resource allocation to centralized MHS (including the hospital and non-hospital residential services) was associated with a greater number of total MHS personnel (22). Moreover, 8.5 times more personnel worked in the mental health residential services in the Finnish study area than in the Spanish comparison area (12). The impact of non-hospital residential services on the personnel costs of the total MHS in Finland has not yet been studied. To further investigate the role of resource allocation in the total personnel costs of the MHS, we set out to study:

1. the number of beds and the personnel in the non-hospital residential services;
2. the relationship of non-hospital and hospital personnel resources with the estimated MHS total personnel costs;
3. the relationship of primary vs. specialized care allocation of personnel with the estimated MHS total personnel costs; and
4. the relationship of personnel resource allocation in different professional groups with the estimated MHS total personnel costs.

2. METHODS

2.1. THE STUDY AREA

The study area comprised 13 non-overlapping areas (Länsi-Uusimaa, Lohja, Hyvinkää, Porvoo, Helsinki, Jorvi, Peijas, Carea, Eksote, Turku, Salo, Vakka-Suomi and Turunmaa) in four hospital districts in southern Finland. The adult population of the areas ranged from 18,200 (Turunmaa) to 500,000 (Helsinki). The total adult population of the study area was 1.87 million adults (43% of the total adult population of Finland).

2.2. THE SERVICE MAPPING

The mapping of the MHS was done as part of the Finnish branch of the REsearch on FINancing systems' Effects on the quality of MENTal health care (FIN-REFINEMENT) project. MHS for adults (aged ≥ 18 years) were classified using the European Service Mapping Schedule – Revised (ESMS-R) service mapping tool (23–26). The ESMS-R tool follows a hierarchical structure, where the main types of care provided are divided into 6 main branches: residential care (R), day care (D), outpatient care (O), information services (I), accessibility services (A) and self-help and voluntary care (S). In this study, only the results on residential care, day care and outpatient care were explored.

The mapping was done in 2012 in the Carea and Eksote areas; in 2013 in Turku, Turunmaa, Salo and Vakka-Suomi; and in 2014 in the other areas (Jorvi, Peijas, Helsinki, Länsi-Uusimaa, Lohja, Hyvinkää and Porvoo). The mapping included mental health and addiction services at the primary, secondary and tertiary levels, and from the public, private and third-party sectors. Single private psychiatrists and psychotherapists were not included in the mapping of personnel resources. A more detailed description of the mapping is provided in previous publications (17,21,27). The personnel resources in different professional groups (physicians, psychologists, nurses, social workers and personnel with lower education) were expressed as full-time equivalents (FTE) per 100,000 adult inhabitants.

2.3. THE MENTAL HEALTH INDEX

The Mental Health Index (MHI) is provided by the Finnish Institute for Health and Welfare (28). In counting the MHI for a given area, equal weight is given to the three components of the MHI: (1) the number of persons eligible for special reimbursement for antipsychotic medication, (2) the number of persons on disability pension for psychiatric reasons, and (3) the number of suicides and number of suicide attempts that lead to hospital care. In Finland, special reimbursement for antipsychotic medication is provided for all persons with a long-term or recurrent psychotic illness (both non-affective psychoses and mood disorders with psychotic symptoms). Special reimbursement is not granted for other uses of psychiatric medications. The average MHI is for a 3-year period. The MHI for the whole country is defined as 100. Therefore, an MHI over 100 indicates a higher than average disease burden and need for services, and a MHI under 100 is lower than the average. The MHI for the years 2010–2012 was used.

2.4. SOCIODEMOGRAPHIC VARIABLES AND PERSONNEL COSTS

The sociodemographic indicators of the unemployment rate, the average length of education after primary school, the percentage of single households and the amount of sold alcohol were collected from the Finnish Statistics and Indicator Bank (29). The data from the year 2012 was used. The personnel costs were estimated by using the average salary of different professional groups multiplied by 1.25 to account for the social security costs and other costs covered by the employer. The data was collected from Statistics Finland (30), the Finnish Medical Association (31) and www.kuntarekry.fi (32). The personnel costs were expressed as €/1000 adults/year.

2.5. STATISTICS

The units of statistical analysis were the 13 areas. To explore the association between variables, the Spearman rank correlation was used. A linear regression model was used to predict total personnel costs by the total personnel in non-hospital residential services and hospital inpatient services. The model was built by controlling one-by-one for the sociodemographic variables, and a model was also built that included all the sociodemographic variables. The normality assumption of residuals in linear regression analysis was checked by using the Shapiro-Wilk test to ensure the fit of the model. For statistical analysis, SPSS version 27 was used (IBM Corp., Armonk, NY, USA).

RESULTS

The mean number of FTE personnel in the main types of care and in different professional groups in the study areas are presented in [Table 1](#) and [Figures 1](#) and [2](#). When summing up all the study areas, 30.6% of the personnel resources were allocated in outpatient care, 7.7% in day care services, 27.4% in hospital residential care and 34.4% in non-hospital residential care.

Table 1. The mean number of total personnel in different types of care, different professional groups, in primary vs. specialized care, and the sociodemographic variables in the study areas.

		N	Mean	Std. Deviation
Mean number of total personnel in different types of care	Outpatient service personnel FTE/100,000 adults	13	103.2	22.8
	Day care service personnel FTE/100,000 adults	13	26.7	14.6
	Hospital personnel FTE/100,000 adults	13	96.5	21.8
	Non-hospital residential service personnel FTE/100,000 adults.	13	123.3	30.9
Mean number of personnel in different professional groups	Physicians FTE/100,000 adults	13	21.2	7.8
	Nurses FTE/100,000 adults	13	123.6	27.6
	Psychologists FTE/100,000 adults	13	13.6	3.6
	Social workers FTE/100,000 adults	13	8.6	2.3
	Other personnel FTE/100,000 adults	13	182.7	45.1
	Total personnel FTE/100,000 adults	13	349.7	59.4
Primary vs. specialized care personnel	Primary care total personnel FTE/100,000 adults	12*	187.9	43.2
	Specialized care total personnel FTE/100,000 adults	12*	166.2	33.3
	Primary care personnel/total personnel ratio	12*	0.53	0.073
Personnel costs	Estimated personnel costs €/1000 adults/year	13	166132	28322

*Not included: Eksote area, where the primary and secondary care are integrated

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		N	Mean	Std. Deviation
Sociodemographic indicators describing the study areas	MHI	13	92.1	21.1
	Average length of education (years after primary school)	13	3.4	0.5
	Unemployment rate, %	13	8.2	2.5
	Sold Alcohol (litres of 100% alcohol/adult/year)	13	8.1	1.1
	Single Households (% of households)	13	39.6	5.7
	Adult population	13	128,039 (median)	72,495–169,474 (25–75% range)

Figure 1.

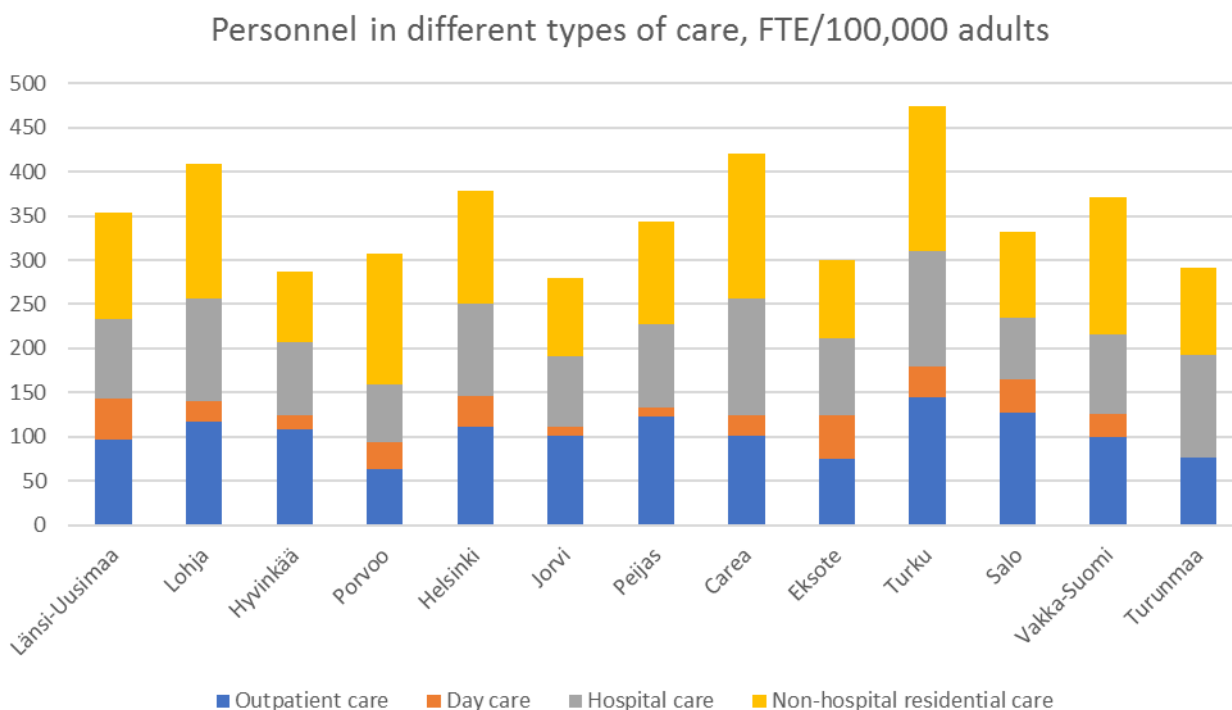
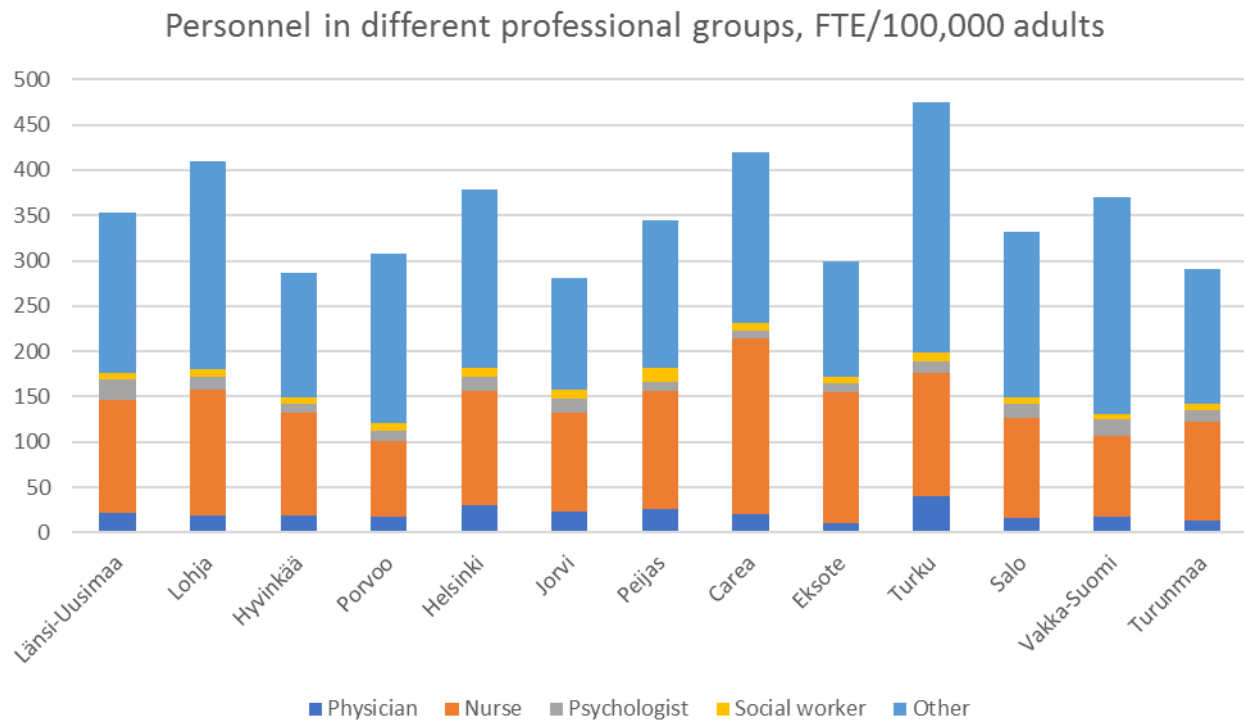


Figure 2.



The number of total personnel correlated significantly with the MHI (0.604, $p=0.029$), the unemployment rate (0.650, $p=0.016$), the percentage of single households (0.610, $p=0.027$), the number of personnel in hospital residential services (0.72, $p=0.006$) and the number of personnel in non-hospital residential services (0.87, $p<0.001$). The number of hospital personnel correlated significantly with the amount of sold alcohol (0.603, $p=0.029$), the percentage of single households (0.560, $p=0.046$) and the number of personnel in the non-hospital residential services (0.62, $p=0.021$). None of the other service types showed a correlation with the sociodemographic variables (data not shown).

In the whole study area, the total number of personnel in the non-hospital residential services was 119.5 FTE per 100,000 adults, of which 40.5 FTE per 100,000 were in services for patients with substance abuse disorders, 61.9 FTE per 100,000 for persons with mental health disorders and 17.2 FTE per 100,000 for both (Table 2). Of the personnel in the non-hospital residential care services, 93.3% were allocated to non-acute residential care services. The total number of beds in non-hospital services were 122.7 per 100,000 adults for patients with substance abuse disorders, 156.5 for mental health disorders and 54 for both (Table 2). Of the personnel in non-hospital residential services, 0.8% were physicians, 16.8% were nurses, 0.1% were psychologists, 0.6% were social workers and 82% were other professionals (data not shown).

Table 2. The total staff and number of beds in the non-hospital residential services by ESMS code, service user type (substance abuse disorder patients, mental health disorder patients or combined service for substance abuse/mental health disorder patients). The whole study area is pooled.

ESMS code	User type	Total staff – FTE	Number of beds	Total staff: FTE/100,000 adults	Total beds/100,000 adults
R3.1 (Acute, non-physician 24h cover)	Substance abuse	148.2	168	7.9	9.0
R5 *(Non-acute 24h physician cover)	Substance abuse	3.6	6	0.2	0.3
R8 (Non-acute, non-physician 24h cover, 24h support)	Substance abuse	192.0	348	10.3	18.6
	Mental health	51.4	112	2.7	6.0
	Combined	15.1	45	0.8	2.4
R9 (Non-acute, non-physician 24h cover, daily support, time-limited stay)	Substance abuse	12.0	36	0.6	1.9
	Combined	23.0	54	1.2	2.9
R11 (Non-acute, non-physician 24h cover, 24h support)	Substance abuse	234.2	847	12.5	45.3
	Mental health	887.5	1989	47.4	106.3
	Combined	273.0	559	14.6	29.9
R12 (Non-acute, non-physician 24h cover, daily support)	Substance abuse	156.3	835	8.4	44.6
	Mental health	208.2	789	11.1	42.2
	Combined	57.0	255	3.0	13.6

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ESMS code	User type	Total staff – FTE	Number of beds	Total staff: FTE/100,000 adults	Total beds/100,000 adults
R13 (Non-acute, non-physician 24h cover, less than daily support)	Substance abuse	11.5	55	0.6	2.9
	Mental health	10.4	39	0.6	2.1
	Combined	10.0	97	0.5	5.2
R14 (other non-acute)	Substance abuse	15.0	107	0.8	5.7
Total	Substance abuse	757.8	2295	40.5	122.7
	Mental health	1157.5	2929	61.9	156.5
	Combined	321.1	1010	17.2	54.0
	TOTAL	2236.4	6234	119.5	333.2

*R5 is covered by a physician 24h. The other above-mentioned service types do not offer 24h coverage by a physician.

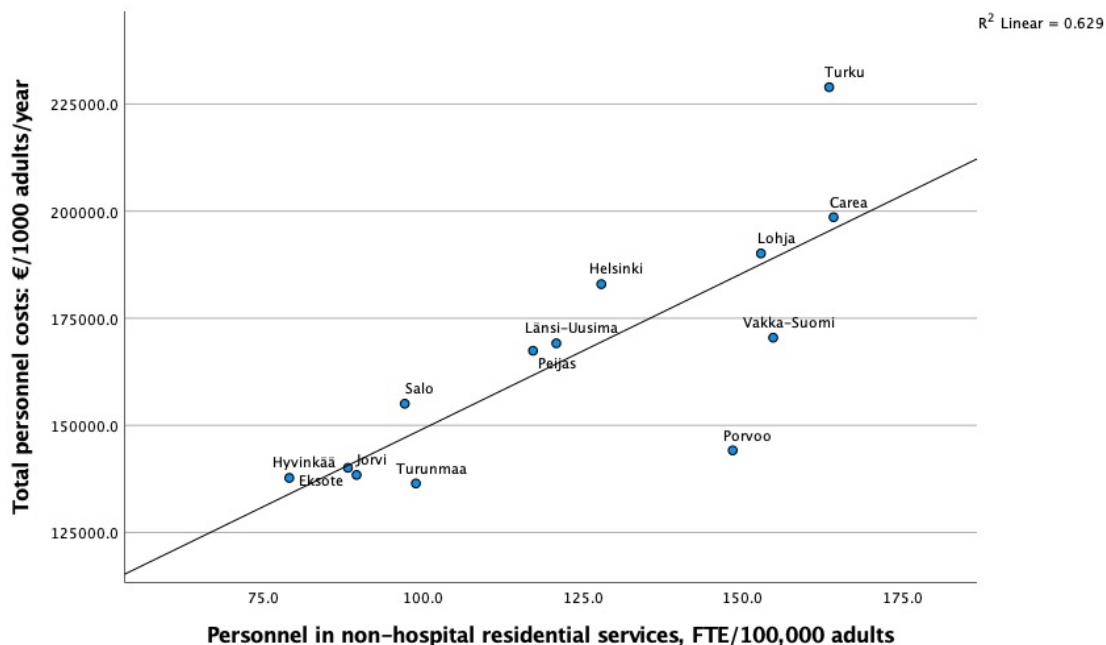
In a multiple linear regression model, the number of non-hospital residential services significantly predicted the total personnel costs after controlling one-by-one for the MHI, the average length of education, the unemployment rate, the amount of sold alcohol and the percentage of single households. In the model, where all these sociodemographic variables were included simultaneously, the number of non-hospital residential service personnel still was a significant predictor of total personnel costs ($p=0.018$, $R^2=0.839$) (Table 3). The association is illustrated in Figure 3.

Table 1. The mean number of total personnel in different types of care, different professional groups, in primary vs. specialized care, and the sociodemographic variables in the study areas.

Model	Unstandardized Coefficients		t	Sig.	R ²	
	Standardized by:	B				Std. Error
Independent variable: Personnel in non-hospital residential services, FTE/100,000 adults	1) none	726.8	168.3	4.3	0.001	0.63
	2) MHI	564.1	161.5	3.5	0.006	0.75
	3) Education	752.6	175.8	4.3	0.002	0.65
	4) Unemployment	603.9	164.0	3.7	0.004	0.73
	5) Sold alcohol	703.0	173.8	4.0	0.002	0.65
	6) Single households	588.0	135.6	4.3	0.001	0.81
	7) all (1–6)	554.3	172.1	3.2	0.018	0.84

Dependent variable: Total personnel costs, €/1000 adults/year

Figure 3. The association between the number of personnel in non-hospital residential services and the total personnel costs (0.85, p<0.001, Spearman correlation).



In a similar multiple regression model, the number of hospital residential service personnel lost its significance as a predictor of total personnel costs when controlling one-by-one for the MHI and the number of single households. The normality assumption of the model's residuals was not met in the one-by-one model standardized with unemployment and the MHI. In a regression model controlled for MHI, the education level, unemployment rate, sold alcohol and single households,

the number of personnel in hospital residential services was a significant predictor of total personnel costs ($p=0,016$; $R^2=0,846$) (Table 4).

Table 4. Linear regression models explaining the total personnel costs with the number of personnel in hospital inpatient services, standardized by sociodemographic indicators (one-by-one, and all-in-one model).

Model		Unstandardized Coefficients		t	Sig.	R ²
Standardized by:		B	Std. Error			
Independent variable: Personnel in hospital services, FTE/100,000 adults	1) none	949.7	266.7	3.6	0.004	0.54
	2) MHI*	668.9	309.3	2.2	0.056	0.63
	3) Education	954.5	280.5	3.4	0.007	0.54
	4) Unemployment*	747.3	291.9	2.6	0.028	0.61
	5) Sold alcohol	1140.8	335.1	3.4	0.007	0.57
	6) Single households	677.6	308.2	2.2	0.053	0.62
	7) all (16)	1095.7	328.4	3.3	0.016	0.85

Dependent variable: Total personnel costs, €/1000 adults/year

*The normality assumption of the residuals of the model was not met.

The outpatient and day services showed no statistically significant associations with the total costs or other variables (data not shown).

The primary care orientation, measured by the proportion of personnel in primary care services to the total personnel resources, did not correlate with the total personnel resources or the total personnel costs.

Of the different professional groups, the total number of physicians and the number of “other personnel” (auxiliary nurses, and non-specified other professionals) correlated directly with the total personnel costs. When controlled for sociodemographic indicators in a linear regression model, the number of physicians ($p=0.046$, $R^2=0.785$) and the number of other personnel ($p=0.007$, $R^2=0.879$) still remained significant predictors of the total personnel costs (data not shown).

DISCUSSION

In this study, we found that the personnel costs of non-hospital residential services are a significant cost driver of the MHS in southern Finland. We found wide variations between areas in the personnel resources and the structure of MHS. The variation was not explained by regional needs. This implies a need to coordinate practices and models for better care at the national level.

While the field has not been widely studied, it is a consensus that a proportion of people with severe mental health disorders need long-term residential care. There is no evidence on the optimal size of a residential unit, but a greater degree of privacy, service-user autonomy and involvement, provision of regular physical health screening, provision of evidence-based psychosocial interventions through integrated programmes and positive therapeutic relationships between staff and service users are keys to better outcomes of institutional care (33). In a systematic review, the outcomes of supported accommodation among deinstitutionalized patients showed positive or neutral results in psychiatric symptoms, rates of rehospitalization and social functioning, but no improvement in the quality of life or employment. More restrictive housing services were associated with poorer outcomes (34).

It is important that the level of support provided by the residential services meets the needs of the patient (35). In practice, the level of institutionalization of the housing settings does not necessarily reflect the level of functional impairment in patients with severe mental health disorders. Neither do the patients necessarily move on to less intensively supported housing. Instead, the housing type is often a long-time solution (36).

According to a Finnish survey, patients living in non-hospital residential services and their relatives hope for independent living circumstances for the patient as much as possible. When possible, they prefer services brought to the patient's home rather than living in non-hospital but institution-like residential services. Also, patients wish for flexible support that meets their changing needs, meaningful daytime activity and access to acute services providing interventions in cases of crisis. Yet, it was found that some of the non-hospital residential services still are large and institution-like, located remotely from services, and do not provide adequate rehabilitation, privacy and autonomy for the patients. Some patients were living in non-hospital residential services that do not meet officially defined quality standards, even when less intensive support would be sufficient. On the other hand, some patients were

staying in hospital due to the lack of appropriate supported housing services (37).

In a further survey, a cost analysis of various residential services was made. It was found that even intensive support with independent apartments may be provided without an increase in overall costs compared to institutional non-hospital residential services. Besides lower costs, independent housing also offers privacy and autonomy for the patients. It was also found that municipal authorities in Finland did not have a comprehensive picture of the mental healthcare residential services, especially in larger municipalities (38).

There are several difficulties in estimating the ideal adequate number of personnel resources and beds in the MHS (39,40). However, attempts have been made (41,42). The estimation may be based on: (1) expert consensus, (2) the normative approach, (3) the population health approach, or (4) the observed outcome approach (40). The expert consensus in the United States recommended 50 publicly-funded psychiatric beds per 100,000 inhabitants (43). The normative approach is based on the assumption that approximately similar healthcare systems require a similar number of psychiatric beds. This is problematic, since even in Europe, tenfold differences in the number of hospital beds exist, and it is not clear which number should be the target level (40). In our whole study area, the number of hospital beds per 100,000 adults was 62.8. The number of non-hospital residential service beds was 333 per 100,000 adults, of which 157 beds per 100,000 adults were for patients with pure mental health disorders, 123 beds for patients with substance abuse disorders, and 54 beds for patients with either a mental health or substance abuse disorder (or both). This is higher than the 98 beds per 100,000 recommended level estimated by Harris et al., representing the population health approach (41). Harris et al. estimate that the staff needed for non-hospital non-acute residential services is 95 per 100,000. In our study, the number of personnel in this type of service was 61.9 FTE per 100,000 adults for patients with mental health disorders, 32.4 FTE per 100,000 for patients with addiction disorders, and 17.2 FTE per 100,000 for patients with either mental health or addiction disorders. The non-hospital residential services comprise a substantial part of the total MHS personnel resources, the greatest number of professionals being auxiliary nurses and other professionals with less education.

The observed wide, need-independent between-area differences in personnel resources were not surprising, given the existing lack of comparable, systematically gathered regional data. Without such data, political decision-making will remain random rather than informed. Attention should be paid to the quality of the non-hospital residential services

and to the availability of rehabilitative, general healthcare and therapeutic services for the patients living in community residential care services. National quality standards for non-hospital residential services should be defined, and the relationship between the quality and costs of services should be followed up. Also, attention should be paid to the incentives that are driving the development of this kind of fee-for-service MHS. The development of services brought to independent housing circumstances should be incited, instead of unnecessary lengthening of institutional care.

On the eve of the major social and healthcare reform in Finland, it is important to continue to collect integrated and comparable data on the social and healthcare services to assure high quality of the MHS (safe, effective, patient-centred, timely, efficient and equitable).

STRENGTHS AND LIMITATIONS

A strength of this study is that we used the ESMS-R instrument, which is validated internationally for the classification and comparison of services. The study included the primary, secondary and tertiary care; the public, private and third-sector service providers; and both mental health and substance abuse services—thereby comprehensively covering the MHS of the study area. Data were collected by trained persons in close collaboration with local stakeholders.

The limitations include the small number of catchment areas ($n=13$), which limits the power of the statistical analysis. Also, this study was cross-sectional and gives only a snapshot picture of the MHS. Trends in the development of the MHS through time may lead to temporary phenomena in the balance of service provision and statistical bias. Another weakness was that the study did not provide data on effectiveness, since patient outcome data were not collected and service unit-level data on outcomes were not available. The total costs of the services were not available. Only an estimation of the personnel costs was available, which excludes the costs of administrative, real estate and other related costs.

CONCLUSION

In our study, 34.4% of the total personnel resources of the MHS were allocated to non-hospital residential services, mostly community residential care. The variation in the provision of personnel resources in non-hospital residential services was not explained by indicators of the need for services. Together with the 27.4% of the total personnel allocated to hospital residential services, southern Finland still has an institutionally-oriented MHS structure. The level of hospital and non-hospital bed availability seemed to comply with international recommendations (41,43). Non-hospital residential services are a significant part of the MHS in Finland, and special attention should be paid to coordination and quality of care at these institutions.

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