

Indirect costs of sickness absence caused by mental and behavioural disorders (ICD-10: F00-F99) in Poland in the years 2012-2018

Koszty pośrednie absencji chorobowej spowodowanej zaburzeniami psychicznymi i zaburzeniami zachowania (ICD-10: F00-F99) w Polsce w latach 2012-2018

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KEY WORDS:

- indirect cost
- sickness absence
- mental disorders
- mental illness

ABSTRACT

Introduction: Mental health is necessary for achieving the complete health by individuals. According to WHO, it is "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" (2). Unfortunately, there is an increasing number of people suffering from mental disorders that can deteriorate their life quality, lead to problems with the standard functioning in the society, a drop in productivity, and can cause disabilities.

Purpose of the article: The purpose of this article was to attempt the estimation of indirect costs of sickness absence caused by mental and behavioural disorders (ICD-10: F00-F99) in Poland in the years 2012-2018.

Materials and methods: Indirect costs were estimated with the human capital approach using data on sickness absence provided by the Polish Social Insurance Institution (ZUS) and macroeconomic indicators published by the Central Statistical Office in Poland (GUS). The individual productivity loss was introduced by means of three indicators: Gross Domestic Product (GDP) per capita, Gross Domestic Product per person employed, corrected Gross Domestic Product.

Results: Estimated indirect costs of sickness absence caused by mental and behavioural disorders (ICD-10: F00-F99) in Poland in 2012 were: 1.62 billion PLN measured in terms of GDP per capita, 2.86 billion PLN measured in terms of corrected GDP per person employed, and 4.40 billion PLN measured in terms of GDP per person employed. And those costs in 2018 were 2.93 billion PLN, 4.57 billion PLN, and 7.03 billion PLN respectively, and they were higher by ca. 60-80% than in 2012.

Conclusions: The described estimation of indirect costs can lead to conclusions that mental health care in Poland is quite poor - indirect costs can reach twice the level of National Health Fund (NFZ) expenses on the mental health care.

SŁOWA KLUCZOWE:

- koszty pośrednie
- absencja chorobowa
- zaburzenia psychiczne
- choroby psychiczne

STRESZCZENIE

Wstęp: Zdrowie psychiczne jest niezbędne dla osiągnięcia przez jednostkę pełnego zdrowia – WHO definiuje je jako "dobrostan, w którym jednostka realizuje swoje możliwości, potrafi poradzić sobie z różnorodnymi sytuacjami życiowymi, jest w stanie uczestniczyć w życiu społecznym oraz produktywnie pracować"(2). Niestety coraz więcej osób na całym świecie boryka się z różnego rodzaju zaburzeniami psychicznymi, które mogą prowadzić do pogorszenia jakości życia, problemów z normalnym funkcjonowaniem w społeczeństwie, spadku produktywności, a także do powstania niepełnosprawności.

Cel pracy: Celem niniejszej pracy była próba oszacowania kosztów pośrednich absencji chorobowej spowodowanej zaburzeniami psychicznymi i zaburzeniami zachowania (ICD-10: F00-F99) w Polsce w latach 2012-2018.

Materiał i metody: Koszty pośrednie szacowano metodą kapitału ludzkiego, wykorzystując dostępne dane ZUS dotyczące absencji chorobowej oraz wskaźniki makroekonomiczne publikowane przez GUS. Jednostkową utratę produktywności przybliżono przy pomocy 3 wskaźników: Produktu Krajowego Brutto per capita, Produktu Krajowego Brutto na jednego pracującego i Skorygowanego Produktu Krajowego Brutto.

Wyniki: Oszacowane koszty pośrednie absencji chorobowej z powodu zaburzeń psychicznych i zaburzeń zachowania (ICD-10: F00-F99) w Polsce wyniosły w 2012 r.: 1,62 mld zł przy zastosowaniu do ich pomiaru PKB per capita, 2,86 mld zł przy zastosowaniu skorygowanego PKB w przeliczeniu na jednego pracującego oraz 4,40 mld zł przy zastosowaniu PKB w przeliczeniu na jednego pracującego, natomiast w 2018 roku wyniosły kolejno 2,93 mld, 4,57 mld zł oraz 7,03 mld zł i były o ok. 60-80% wyższe niż w 2012 roku.

Wnioski: Zaprezentowany szacunek kosztów pośrednich może prowadzić do konkluzji, że opieka psychiatryczna w Polsce nie jest w najlepszej kondycji – koszty pośrednie mogą być dwukrotnie wyższe niż wydatki NFZ na opiekę psychiatryczną.

Introduction

Mental health is a crucial element of health models, and its definition. The WHO defines the health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (1). Mental health is defined by the WHO as "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community" (2). Accordingly, mental health is essential to individuals to achieve the complete health.

However, epidemiological studies demonstrate that more and more people are suffering from various types of mental disorders. According to the report of the Commissioner for Human Rights (3), 25-33% of the worldwide population is estimated to be affected by mental disorders. This proportion is said to be ca. 38% in European countries. Epidemiological studies performed in Poland indicate that more than 23% of the Polish population can be diagnosed with at least one mental disorder during their life, whereas ca. 20-30% of people aged 18-64 made complaints on reduced activity, mood disorders, oversensitivity or persistent fear.

The most common mental disorder includes anxiety disorders. It is estimated that 16-17% of the population suffers from such disorders. Further complaints are mood disorders (mainly depression) – ca. 10%, sleeplessness – 7%, addictions – ca. 4%. Mental disorders in many cases deteriorate the life quality, cause problems with the standard functioning in the society, and result in a drop in productivity. They can also lead to infirmities. Neurological diseases and mental disorders are considered to be responsible for 25% of all reasons for infirmities.

The cited epidemiological data show that mental disorders are a serious health problem. Unfortunately, the analysis of the National Health Fund (NFZ) expenditures indicate that funds spent on mental health care in Poland are very low. In accordance with financial plans of NFZ (4-10), funds assigned to that purpose amount to 3.5% of all expenditures on health care (Table 1). In 2018, the amount of ca. 2.9 billion PLN was spent on mental health care and addiction treatment. It should be mentioned that such costs in financial plans of NFZ do not include costs of medicinal products.

In 2018, ZUS reported the issue of 19,948.5 thousand of medical certificates of temporary incapacity for work for the total number of 243,692 thousand days of sickness absence. It was more by ca. 18% than in 2012. The average duration of sickness absence in 2018 was 12.22 days and was shorter by 0.24 day compared to 2012. The number of absence days due to mental and behavioural disorders of people insured with ZUS was 19,424.8 thousand days in 2018 (ca. 39% more than in 2012) and accounted for ca. 8% of total days of sickness absence. The total number of reported medical certificates was 1,102.7 thousand of medical certificates (ca. 34% more than in 2012), and the average duration of sick leave was 17.62 days (Table 2) (11-17).

Expenditures on sickness absences financed by the Social Insurance Fund (FUS) and funds of employing institutions were nearly 18.5 billion PLN. However, no data on costs of sickness absence by reasons in 2018 are available. Expenditures incurred in 2017 on sickness absence due to mental or behavioural disorders amounted to ca. 1.6 billion PLN, which accounted for ca. 9.5% of total expenditures (Table 3) (18-24).

Mental and behavioural disorders were the fifth reason for temporary incapacity for work in 2018 (Fig. 1).

Table 1. Total expenditures of NFZ on mental health care and addiction treatment in the years 2010-2014.

Parameter	2012	2013	2014	2015	2016	2017	2018
total NFZ expenditures [billion PLN]	62.2	63.2	64.5	68.5	71.7	77.7	81.9
NFZ expenditures – mental health care and addiction treatment [billion PLN]	2.2	2.3	2.3	2.4	2.5	2.7	2.9
% of total expenditures	3.51%	3.61%	3.62%	3.52%	3.46%	3.50%	3.50%

Source: compiled by the author on the basis of NFZ data (4-10).

Table 2. Sickness absence due to own illness of people insured with ZUS in the years 2012-2018.

Parameter	2012	2013	2014	2015	2016	2017	2018
Sickness absence in total							
Days of sickness absence [in thousand]	206,776.3	213,392.7	212,616.7	226,717.9	238,659.8	245,568.6	243,692.6
Number of medical certificates [in thousand]	19,948.5	19,792.5	19,204.0	18,311.6	16,965.7	17,334.0	16,600.1
Average duration of sickness absence	12.2	12.4	12.4	12.4	12.5	12.3	12.5
Sickness absence due to mental and behavioural disorders							
Days of sickness absence [in thousand]	14,006.5	15,618.4	16,108.4	17,942.1	18,950.2	19,357.3	19,424.9
Number of medical certificates [in thousand]	1,102.7	1,102.6	1,077.4	1,021.8	927.4	898.8	823.1
Average duration of sickness absence	17.6	17.6	17.6	17.6	17.4	17.4	17.0

Source: compiled by the author on the basis of ZUS data (11-17).

Table 3. Expenditures on sickness absence financed with FUS and funds of employing institutions in the years 2012-2018 [million PLN].

Parameter	2012	2013	2014	2015	2016	2017	2018
Sickness absence in total							
Expenditures of FUS and employing institutions	12,281	13,317	13,523	15,086	16,284	17,651	18,445
Sickness absence due to mental and behavioural disorders							
Expenditures of FUS and employing institutions	907	1,070	1,140	1,360	1,536	1,663	no data available

Source: compiled by the author on the basis of ZUS data (18-24).

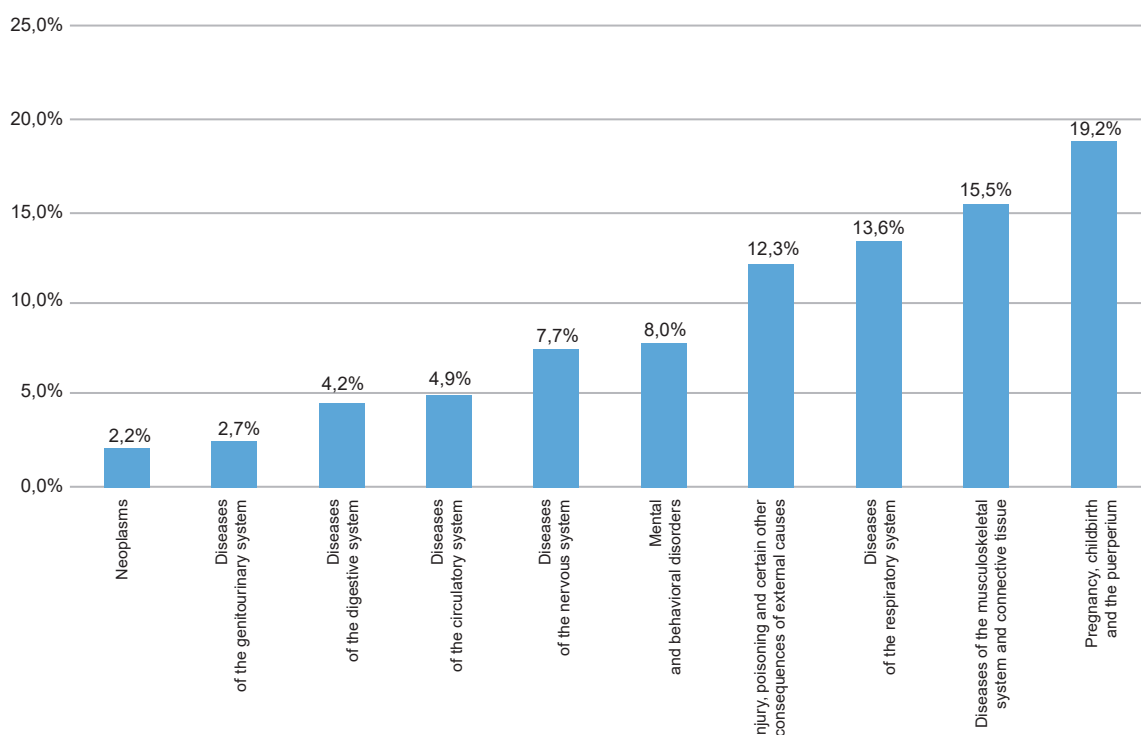


Fig. 1 Structure of days of sickness absence due to own illness of people insured with ZUS in 2018 by disease group.

Source: compiled by the author on the basis of ZUS data (17).

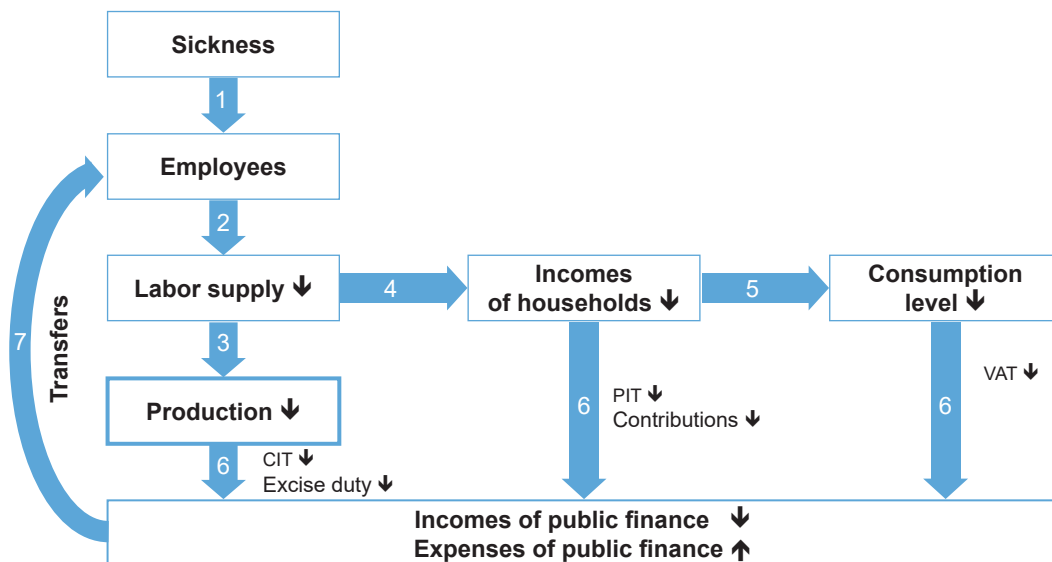


Fig. 2 Economic effects of sickness and their impact on public finances.

Source: EY. Methodology for measuring indirect costs in the Polish system of health protection (25).

Apart from direct costs in the form of expenditures from NFZ and FUS, mental disorders also generate additional costs related to work incapacity and a drop in productivity of the sick, that is, indirect costs. Therefore, real effects of sickness do not only have an impact on a patient, but also on the economy as a whole. The estimation of indirect costs in economic analysis is very important to examine the impact of a specific illness or disease on all participants of the economic life from the macroeconomic perspective. A simplified impact of sickness on macroeconomic values and individual economic entities is presented in Figure 2.

Sickness [1] is a starting point if it has a direct effect (when a worker is on sick leave) or indirect effect (when a worker takes care of an ill person) on working people – the possibility of performing work duties is restricted in both cases. Sickness leads to a drop in labour force provided by households [2]. It results in reduced productivity of enterprises because, apart from the capital, work belongs to main productivity factors [3]. A drop in the number of hours worked generate lower incomes of households [4], which in turn reduces the consumption level [5]. All the above (a drop in incomes of households, reduced consumption and productivity) result in decreased revenues from taxes and contributions, and higher transfers paid by the state to households [7]. As a consequence, sickness deteriorates the situation of the public finances (25).

Indirect costs usually include:

- a loss in production caused by sickness absence (absenteeism),
- a drop in productivity caused by disease or illness of a worker present at work (presenteeism),
- a loss in production caused by permanent incapacity for work,
- a loss in production caused by the death,
- costs of informal care,
- labour costs for unpaid work,

Purpose of the article

The purpose of this article was an attempt to estimate indirect costs of sickness absence (absenteeism) caused by mental

and behavioural disorders (ICD-10: F00-F99) in Poland in the years 2012-2018.

Materials and methods

Three methods of estimating indirect costs (lost production) are currently used:

- human capital approach,
- friction cost method,
- willingness-to-pay method.

The human capital approach was used for the purpose of this paper. It is the most common and frequently used method of estimating indirect costs of sickness (25, 27) as it has been established in the economy theory and its use is relatively easy.

Economists define the human capital as "the source of professional knowledge, experience and skills accumulated by a worker during their education, training and practice, and the value of the worker is determined by opportunities created by the worker for gaining future incomes" (26). The capital of the person cannot be entirely used due to his or her sickness. And the human capital approach assumes that indirect costs caused by the sickness are generated during the whole period, during which the possibility of using the human capital of an individual is reduced (even when work duties of the sick are performed by another worker).

Indirect costs calculated with the human capital approach include:

- production losses caused by the absence of a sick worker (absenteeism),
- production losses caused by lower productivity of a sick worker present at work (presenteeism),
- permanent incapacity for work,
- the death as a result of the disease.

Assuming the specific unit defining efficiency at work is required to estimate indirect costs, and consequently to determine production losses caused by sickness. The analysis of indirect costs does not contain the commonly used measure of efficiency due to problems resulting from reduced possibilities of measurements. No agreement on choosing

Table 4. Demographical data and macroeconomic indicator used in estimating indirect costs of sickness absence caused by mental and behavioural disorders (ICD-10: F00-F99) in Poland in the years 2012-2018.

Parameter	2012	2013	2014	2015	2016	2017	2018
Population [in thousand]	38,533.3	38,495.7	38,478.6	38,437.2	38,433.0	38,433.6	38,411.1
Working population [in thousand]	14,172.0	14,244.3	14,563.4	14,829.8	15,293.3	15,710.8	16,020.0
GDP [million PLN]	1,629,425	1,656,895	1,720,430	1,800,228	1,861,112	1,989,314	2,115,672
GDP per capita [PLN]	42,285	43,034	44,705	46,814	48,432	51,775	55,051
GDP per person employed [PLN]	114,975	116,320	118,134	121,393	121,695	126,621	132,064
corrected GDP per person employed [PLN]	74,734	75,608	76,787	78,905	79,102	82,304	85,842

Source: compiled by the author on the basis of data from the Central Statistical Office (GUS) (35).

Table 5. Sickness absence in Poland in the years 2012-2018.

Parameter	2012	2013	2014	2015	2016	2017	2018
Sickness absence in total [million days]	206.8	213.4	212.6	226.7	238.7	245.6	243.7
Sickness absence acc. to ICD-10: F00-F99 [million days]	14.0	15.6	16.1	17.9	19.0	19.4	19.4
The number of years of lost productivity ICD-10: F00-F99	38,269	42,790	44,132	49,157	51,777	53,034	53,219

Source: compiled by the author on the basis of ZUS data (11-17).

the best measure can be found in papers on economics and pharmacoconomics. EY researchers (25) indicated that the description of costs should be accompanied by the measure which:

- is measurable and expressed in monetary units,
- is understood and commonly accepted,
- takes into account that work is not the only productivity factor,
- takes into account that working people are only part of the population (there is unemployment).

According to the literature review (25), researchers also indicated that the most common measures were:

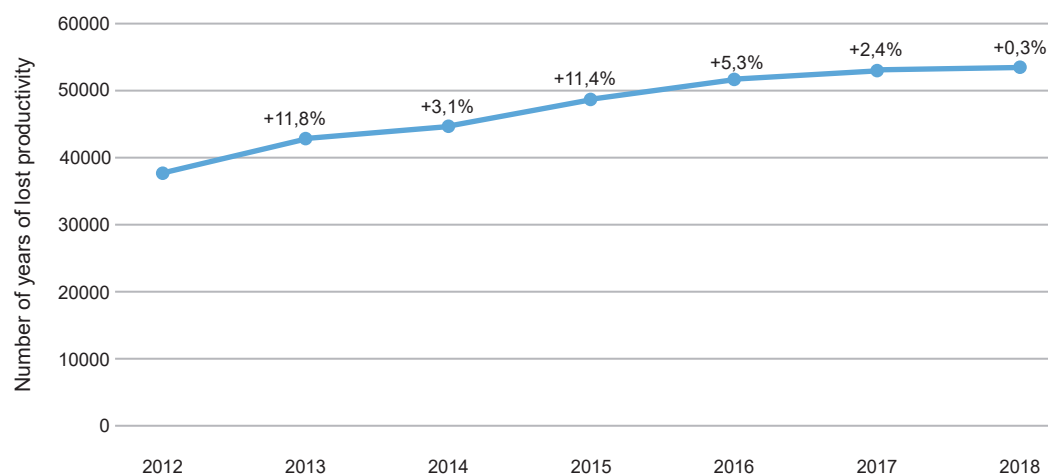
- GDP per capita/GDP per person employed,
- added value per person employed,
- remuneration (with or without contributions paid by employers to FUS).

A loss in the individual productivity was described in this paper using three indicators:

- Gross Domestic Product per capita,
- Gross Domestic Product per person employed,
- corrected Gross Domestic Product per person employed (including corrected factor equal to 0.65 corresponding to the relation between the marginal and the average labour productivity adopted by the European Commission) (25, 28).

Table 4 shows demographical data and macroeconomic indicators used in estimating indirect costs of sickness absence due to mental disorders.

Indirect costs are the product of GDP per capita or per person employed or corrected GDP per person employed (Table 4) and the lost productivity over subsequent years (Table 5) estimated on the basis on data published by ZUS (11-17)

**Fig. 3 Dynamics of an increase in the number of years of lost productivity due to sickness absence caused by mental and behavioural disorders (ICD-10: F00-F99) in Poland in the years 2012-2018.**

Source: compiled by the author on the basis of ZUS data (11-17).

Table 6. Indirect costs of sickness absence caused by mental and behavioural disorders (ICD-10: F00-F99) in Poland in the years 2012-2018 estimated with the human capital approach [billion PLN].

Methodology	2012	2013	2014	2015	2016	2017	2018
acc. to GDP per capita	1.62	1.84	1.97	2.30	2.51	2.75	2.93
acc. to GDP per person employed	4.40	4.98	5.21	5.97	6.30	6.72	7.03
acc. to corrected GDP per person employed	2.86	3.24	3.39	3.88	4.10	4.36	4.57

Source: compiled by the author on the basis of ZUS (11-17) and GUS data (35).

and concerning the number of days of sickness absence caused by mental or behavioural disorders (ICD-10: F00-F99) in Poland in the years 2012-2018 (Table 5). The number of years of sickness absence caused by mental disorders in 2018 was 53,219 and was greater by 39% than in 2012.

Results

Estimated indirect costs of sickness absence caused by mental and behavioural disorders (ICD-10: F00-F99) in Poland were regularly increasing in the years 2012-2018 – on average by 8-10% annually. In 2012 indirect costs amounted to: 1.62 billion PLN measured in terms of GDP per capita, 2.86 billion PLN measured in terms of corrected GDP per person employed, and 4.40 billion PLN measured in terms of GDP per person employed. And those costs in 2018 were 2.93 billion PLN, 4.57 billion PLN, and 7.03 billion PLN respectively, and they were higher by ca. 60-80% than in 2012 (Table 6).

Specific illness or disease resulting in the longest duration of sickness absence contributed the most to indirect costs generated in the years 2012-2018 – in 2018 they were mental and behavioural disorders due to use of alcohol (F10), depressive episodes (F32), recurrent depressive

disorder (F33), other anxiety disorders (F41), and reaction to severe stress, and adjustment disorders (F43) contributed to 76% of estimated indirect costs which amounted to 2.3-5.5 billion PLN (Table 7). Indirect costs generated by those five specific diseases increased by ca. 66%-88% in the years 2012-2018.

Conclusions

Indirect costs of mental disorders were estimated globally at 1.7 trillion US\$ and were much higher than direct costs, which were estimated at 0.8 trillion US\$ (based on data from 2010). For EU, indirect costs reached 798 billion EUR. It is expected that indirect costs will double by 2030 (36). In Australia lost gross domestic product as a result of Australians aged 45-46 exiting the labour force because of depression and other mental and behavioural disorders in 2015 was 6.67 billion AU\$ (0.45 % GDP), of which 3.17 billion AU\$ (0.21% GDP) were lost due to depression, and is going to increase to 9.8 billion AU\$ in 2030 (4.33 billion AU\$ due to depression) (37).

The estimation results indicate that indirect costs of sickness absence caused by mental and behavioural disorders (ICD-10: F00-F99) in Poland are very high – they were in the range of ca. 2.9-7.0 billion PLN in 2018 (the difference

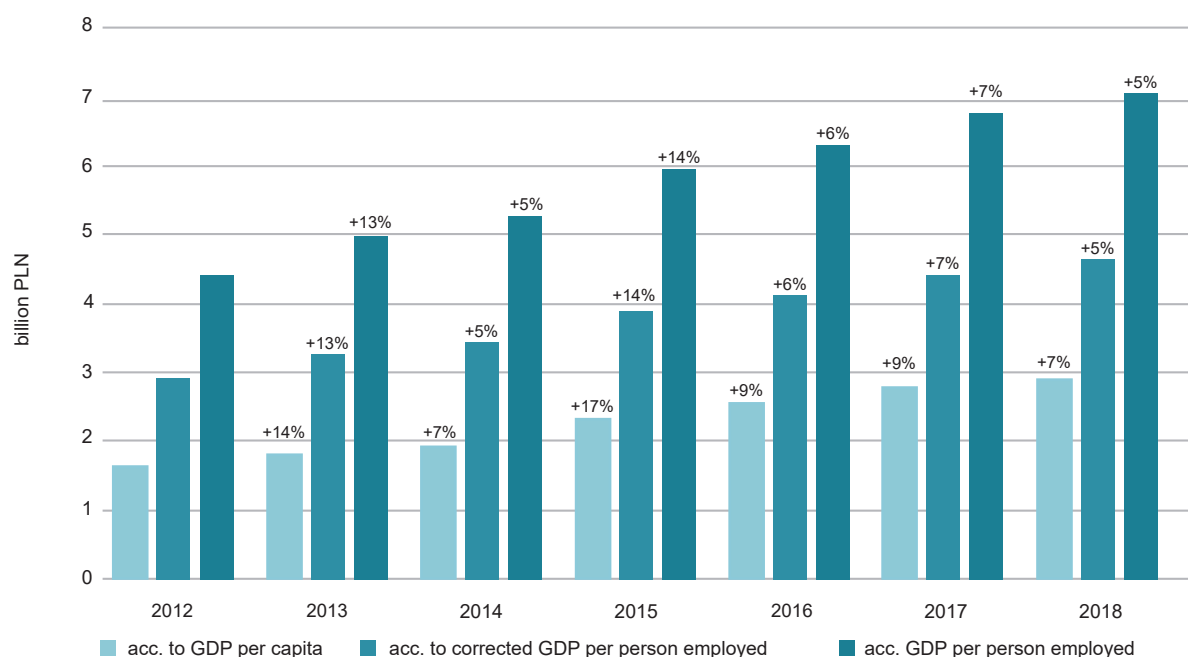


Fig. 4 Indirect costs of sickness absence caused by mental and behavioural disorders (ICD-10: F00-F99) in Poland in the years 2012-2018 estimated with the human capital approach and annual dynamics of their increase.

Source: compiled by the author on the basis of ZUS (11-17) and GUS data (35).

Table 7. Indirect costs of sickness absence caused by five specific diseases being the main reason for sickness absence caused by mental and behavioural disorders (ICD-10: F00-F99) in Poland in the years 2012-2018 estimated with human capital approach [million PLN].

Methodology	2012	2013	2014	2015	2016	2017	2018
mental and behavioural disorders due to use of alcohol (F10)							
acc. to GDP per capita	116	113	117	125	135	149	157
acc. to GDP per person employed	315	305	308	325	339	365	376
acc. to corrected GDP per person employed	205	198	200	211	220	237	244
depressive episodes (F32)							
acc. to GDP per capita	393	443	450	503	522	543	554
acc. to GDP per person employed	1,067	1,198	1,189	1,304	1,312	1,328	1,330
acc. to corrected GDP per person employed	694	779	773	847	853	863	865
recurrent depressive disorder (F33)							
acc. to GDP per capita	170	192	203	235	253	285	299
acc. to GDP per person employed	461	519	537	610	636	696	717
acc. to corrected GDP per person employed	300	337	349	397	414	453	466
other anxiety disorders (F41)							
acc. to GDP per capita	164	198	233	287	333	375	417
acc. to GDP per person employed	445	535	616	745	836	918	1,001
acc. to corrected GDP per person employed	289	348	401	484	543	597	651
reaction to severe stress, and adjustment disorders (F43)							
acc. to GDP per capita	385	471	516	639	718	795	879
acc. to GDP per person employed	1,046	1,274	1,365	1,658	1,805	1,944	2,108
acc. to corrected GDP per person employed	680	828	887	1,078	1,173	1,264	1,370
Total							
acc. to GDP per capita	1,226	1,418	1,519	1,790	1,961	2,147	2,306
acc. to GDP per person employed	3,334	3,831	4,015	4,642	4,927	5,251	5,533
acc. to corrected GDP per person employed	2,167	2,490	2,610	3,017	3,203	3,413	3,596

Source: compiled by the author on the basis of ZUS (11-17) and GUS data (35).

depended on macroeconomic indicators used for calculations). The comparison with funds paid by the National Health Fund on mental health care and abuse treatment (ca. 2.9 billion PLN in 2018) shows the scale of indirect costs of sickness absence. These costs can double funds of NFZ transferred to mental health care.

This paper only focuses on estimating indirect costs of absenteeism caused by mental or behavioural disorders. It can be considered as a narrow analytical approach because total indirect costs also include costs of permanent (total or partial) incapacity for work, costs generated by lower productivity of workers performing their duties despite their

sickness (presenteeism), and the loss in productivity caused by premature death due to mental disorders, and informal care for sick people (carer absenteeism) as in other analysis.

The methodology of human capital approach described in this paper is also often criticized for the possible over-estimation of production losses as this method takes into account indirect costs resulting from the permanent incapacity for work or the death caused by the disease. This problem can be solved by using life duration tables and factors of occupational activity in calculations, and by making corrections which include the decreasing labour productivity. However, the above arguments do not refer to this

paper which only describes the estimation of indirect costs of the sickness absence.

Any estimation errors can be the result of not taking into account the economic cycle and the presence of its different phases – the amount of production losses was fluctuating depending on a downturn or an upturn in the economy. Thus, indirect costs could be overestimated in the boom stage of the cycle or underestimated in the slump stage.

However, this criticism is not fully justified because the unit production value in the economy is not subjected only to economic fluctuations, but also to the growth trend. Thus, the elimination of recurring effects does not solve the fundamental issue related to the estimation of indirect costs, that is, a lack of "universal" measure for a specific disease, which is attributed to a specific time (e.g. month or year). Moreover, current amounts (not regularly corrected) of indirect costs inform decision-makers about the burden level at a specific moment.

The majority of faults in the human capital approach do not refer to the concept itself, but to imperfections of measures for production losses.

This analysis can lead to conclusions that indirect costs are the crucial element of the disease effects. An effort should be made to develop standards and guidelines to ensure the reliable estimation of indirect costs. More reliable calculations could encourage decision-makers to take real actions to reduce indirect costs, that is, to improve the health system.

Although the importance of indirect costs with reference to total costs generated by the disease has been acknowledged, there is no agreement on the need for including them into pharmaco-economic analyses (38, 39). It is probably caused by no formal requirements and no proper guidelines that would ensure their reliable evaluation (39).

The described estimation of indirect costs can lead to conclusions that underfunding of the mental health care in Poland results in a regular increase in the sickness absence, and thus in an increase in indirect costs of absenteeism due to mental and behavioural disorders.

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