Health policy 125 (2021) 751–759

Contents lists available at ScienceDirect

Health policy

journal homepage: www.elsevier.com/locate/healthpol

Bundled payments for chronic diseases increased health care expenditure in the Netherlands, especially for multimorbid patients.

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ARTICLE INFO

Article history:
Received 22 December 2020
Revised 9 April 2021
Accepted 11 April 2021

Keywords:
Bundled payment
Chronic disease
Multimorbidity
Cost

ABSTRACT

Bundled payments aim to stimulate the integration of healthcare services and ultimately reduce healthcare expenditure growth through improved quality of care. The Netherlands introduced bundled payments for chronic diseases in 2010 by reimbursing providers annually for a bundle of primary care services related to COPD, Diabetes, or Vascular Risk Management. We aimed to assess the long-term effects of these bundled payments on healthcare expenditure. We used health insurance claims data from 2008 to 2015 to compare the healthcare expenditure between everyone who was included in bundled payments and a control group. We performed a difference-in-difference analysis in combination with propensity score matching and found that bundled payments consistently increased health care expenditure over seven years. The average half-year increase was €233 (95%CI: 204-262) for DM2, €609 (95%CI: 533-686) for COPD, and €231 (95%CI: 208-254) for VRM, representing 13%, 52%, and 20% of 2008 half-year cost. The increase was higher for those with multimorbidity compared to those without multimorbidity. This suggests that the expectations of the bundled payments are yet to be fulfilled.

Introduction

To improve the quality of care for the growing number of people with multiple chronic diseases (i.e. multimorbidity) [1], many countries are trying to make a shift towards person-centred integrated care [2]. This is based on the expectations that integration of services within and across different health and social care sectors improves population health and patient experience, while it flattens healthcare expenditure growth [3,4]. The main challenge is the upscaling of integrated care initiatives after a successful pilot and evaluation phase [5]. This is partially because of the fragmentation in payment models for different healthcare services and clearly demarcated budgets for these services [6]. Health policy makers worldwide are seeking provider payment models that incentivise integration.

Various typologies of payments systems have argued that bundled payments can theoretically stimulate integration of care by rewarding healthcare providers for delivering a bundle of well-aligned complementary services targeted to the patient's needs, rather than rewarding individual medical and care activities [7-12]. Bundled payments are therefore designed to incentivise providers to act more holistically, to collaborate, take joint responsibility, and use resources more flexibly and efficiently [8,13-15]. This should improve quality of care, lead to better health outcomes and experience with care, and eventually prevent avoidable healthcare expenditure [16-23].

Bundled payments can take a variety of forms, depending on the definition of the target population, the care bundle, and the providers involved. Examples include payments for single episodes of care or [24-26] payments that cover all types of care for a category of patients [10]. The Dutch bundled payments for chronic dis-

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https://doi.org/10.1016/j.healthpol.2021.04.004

ease management are one of the most prominent examples of such payments in Europe [8,27]. They were structurally implemented in 2010 and designed as a risk-adjusted annual fee per patient for the provision of various integrated primary care services for type-2 diabetes mellitus (DM2), cardiovascular risk management (VRM), or chronic obstructive pulmonary disease (COPD) [7,16].

Although a decade has passed since the introduction of the Dutch bundled payments, it is still unclear whether they achieved their objective to reduce healthcare expenditure growth [28,29]. The limited and inconclusive evidence is focused on diabetes care and based on small sample sizes or short evaluation periods. Two previous studies found no substitution from secondary to primary care and no savings in total expenditure [30,31], while one study found a relative reduction in the number of diabetes patients being treated in secondary care [32]. Echoing criticism in the Netherlands that bundled payments were focused on single conditions [7,33], there is still no evidence about the impact of bundled payments on the expenditure of people with multimorbidity. People with multimorbidity are more likely to be affected by changes in provider payment because they use more and different healthcare services [34], and they may benefit from spill over effects of single-disease bundled payments on managing other chronic diseases [2,28].

Against this background, the aim of our study was to investigate the long-term effect of bundled payments for DM2, COPD and VRM in the Netherlands on healthcare expenditure and to assess whether this effect was different for people with multimorbidity.

Methods

Payment reform: the Dutch bundled payments for chronic diseases

The Dutch healthcare system is a social health insurance system with universal health coverage and managed competition among healthcare insurers and among care providers [35]. The Netherlands has 17 million inhabitants who all have a compulsory health insurance with a deductible of €385 per adult in 2020. It has a strongly developed primary care system in which the general practitioner (GP) has a gatekeeping role [36]. The deductible does not apply to GP care.

Bundled payments for DM2, VRM and COPD were introduced in 2010 to support the implementation of proactive, person-centred, integrated primary care programmes. They cover services provided by a multidisciplinary group of primary care providers based on the 'Standards of Care' for DM2, VRM and COPD [5,10]. The bundle generally covers consultations with GPs, specialised nurse practitioners, self-management and lifestyle interventions (e.g. smoking cessation, nutritional counselling), diabetic foot care and a single assessment of more complex patients by a medical specialist, all related to the chronic disease at stake. The bundle also includes care coordination, personalised care planning and integrated ICT systems to support the communication between providers and monitor quality indicators. Services included in the bundle are exempt from the obligatory deductible in the Dutch healthcare insurance (€165 in 2010).

Bundled payments were implemented alongside an organisational change to primary care, introducing the Care Group. The Care Group is a cooperation of independent primary care providers (mostly GPs) which takes care of the organizational and contractual aspects of providing integrated primary care programmes for chronic diseases. Health insurers negotiate annually the services to be covered and price of the bundled payment for a chronic care programme with each Care Group individually. The services are either provided by professionals employed by or associated with the Care Group or subcontracted to other professionals. The quality of the delivered care is monitored by a branch organisation of primary care providers (INEEN) that annually reports a set of disease-specific performance indicators [37]. The monetary value of the bundled payment is not greatly influenced by measured performance.

Patient enrolment in the bundled payment is based on inclusion and exclusion criteria agreed to between the Care Groups and insurers. Enrolment is voluntary and occurs either when individuals attend a physician appointment, are newly diagnosed with a relevant chronic condition, or by case finding in existing electronic medical records. Patients with multiple chronic diseases can only be enrolled in one chronic care programme.

Study design

In this longitudinal controlled study, we estimated the difference in total healthcare expenditure covered by the statutory Dutch health insurance between individuals enrolled in bundled payments and individuals who were never subject to a bundled payment. Since the timing and content of bundled payment was not subject to randomisation, we adopted a quasi-experimental study design as suggested in guidelines to perform natural experiments and evaluate complex interventions [38,39]. To do this, we combined difference-in-differences (DiD) analysis, which is used to account for differences in non-observable characteristics between intervention and control groups, with propensity score matching (PSM) to also reduce observed bias [40,41].

Data

We used health insurance claims data from 2008 to 2015 provided by Vektis, [42] an organisation that collects claims data from all Dutch health insurers and covers about 99% of the total insured population. For all individuals we obtained data on healthcare expenditure, age, sex, pharmacy cost groups, and socio-economic status (SES) based on their residential postal (zip) code. This does not include long-term institutional care expenditure covered by the Exceptional Medical Expenses Act (AWBZ), later transformed to the Long-term Care Act (WLZ). Pharmacy cost groups are groups of diseases (20 in 2008) that are most predictive of total health care expenditure and were developed for the risk-equalisation formula in the Dutch health insurance system [43]. Allocation to a pharmacy cost group is determined by the use of particular doses of prescription drugs deemed related to a particular disease [43]. Expenditure data was aggregated to half-year periods per individual insured and was inflation-adjusted using Dutch Consumer Price Index to 2015 levels [44].

Specification of intervention and control groups

We specified three intervention groups, which consisted of all individuals in the Netherlands who were enrolled in a bundled payment for DM2, COPD, or increased vascular risk sometime between July 2008 and December 2015. Patient enrolment was defined based on the claim codes for bundled payment that are recorded in the Vektis database. We followed the intention to treat principle and assigned individuals to the intervention groups if they had ever been assigned a bundled payment. The reason for using "ever assigned" was that individuals who were referred to secondary care, for example after a complication, cannot claim bundled payments when they remain to be treated in outpatient secondary care. Not keeping these individuals in the intervention group would wrongly point to savings in the intervention group.

We followed a three-step approach to define the control group. In the first step, each patient in the intervention group was one-to-one matched to a control patient (i.e. patients who had never had a claim for bundled payment in the Vektis dataset) based on age, sex, SES, and most expensive pharmacy cost group in 2008. In

this step, 2.3 million individuals were identified as eligible for inclusion in the control group. In the second step, we randomly selected one million from the 2.3 million individuals to be included in the control group. The random selection of one million individuals provided us with enough statistical power while avoiding administrative overburdening of VEKTIS services. In the third step, we used propensity score matching and inverse probability weighting to statistically adjust this one million control group to create a comparable control group for each of the three intervention groups separately, as described in more detail in the following section.

Statistical analysis

Difference-in-differences analysis was used to estimate the impact of bundled payment (i.e. average treatment effect on the treated) on total health care expenditure, as the primary outcome [40]. We compared changes in healthcare expenditure over time in patients with bundled payments to the counter-factual (i.e. their healthcare expenditure without bundled payments). The difference-in-difference analysis was performed on propensity score matched individuals with fixed effects for time and individuals. Patients were enrolled in bundled payments at different time points, meaning that those starting later also served as controls for those starting bundled payments earlier. To investigate possible non-linear treatment effects, we estimated time-varying treatment effects [40]. This was done by specifying an interaction term between the indicator for intervention group membership and a count variable of half-year periods after the individual's first enrolment in a bundled payment. Details of the approach are reported in Appendix 1. In the regression we further controlled for whether an individual died in the half-year period. We also included a linear trend term to model any remaining difference between the intervention and control groups prior to the start of the intervention. Standard errors were clustered at the individual level.

Propensity score matching was performed by using inverse probability weighting (IPW) to reduce differences in age, sex, socio-economic status, pharmacy cost groups, date of death, and total healthcare expenditure between the intervention and control group in the first half of 2008. The inclusion of these covariates as potential confounders was informed by the literature [34]. The weights were estimated separately for each of the three bundled payments (i.e. diabetes, COPD, and increased vascular risk). To avoid individuals with extreme weights unduly influencing results, we trimmed weights at 0.1 (lower bound) and 10 (higher bound) [45]. We corrected for survival differences between the two groups because they are likely caused by immortal time bias (i.e. those in the intervention group have to live long enough to be enrolled at any point during 2008-2015) [46] or inclusion bias (i.e. those with short expected survival were probably not likely to be included in the bundled payment cohort).

Statistical robustness

To test the appropriateness of our difference-in-difference analysis, we test the parallel trends by estimating a regression model with a time trend for each cohort and with all the data for the control cohort but only pre-intervention data for the intervention cohort. A small time trend would then indicate that there was little difference between the two cohorts before intervention starts and makes the difference-in-difference analysis more credible [40]. In addition we performed a Granger causality test to ensure that the results are not subject to reverse causality (e.g. patients were included in the bundled payment because they had increasing expenditure) [40]. In the reverse causality test we expected the interaction terms to be smaller before starting the bundled payment than after the start of the bundled payment.

We assessed the performance of propensity score matching by comparing the absolute standardized mean differences before and after matching, estimating Rubin's R (the ratio of treated to (matched) non-treated variances of the propensity score index, that should be between 0.5 and 2), and Rubin's B (the absolute standardised difference of the means of the linear index of the propensity score in the treated and (matched) non-treated group, that should be less than 25) [47].

Secondary outcomes

We investigated the impact of enrolment in bundled payment on the four main types of spending that represent about 90% of total basic statutory Dutch healthcare spending, i.e. hospital care (in- and outpatient), medication, mental health care, and primary care (excluding the expenditure of the bundled payments). We also disentangled the cost of the bundled payment amount itself from the expenditure for primary care.

Subgroup and sensitivity analyses

Subgroup analyses were performed to investigate whether the treatment effect of bundled payment differed between individuals with and without multimorbidity. Multimorbidity was defined as having two or more pharmacy cost groups. The underlying hypothesis was that individuals with multimorbidity have more complex needs and are more frequent users of health services across several clinical pathways than individuals with single chronic conditions and therefore, they may benefit more from well-coordinated care [48-51]. Moreover, the impact of the general lifestyle interventions included in the care programmes covered by the bundle (e.g. smoking cessation, increased physical activity, healthier nutrition) is expected to be disease-exceeding. In the sub-group analysis, we compared individuals with multimorbidity in the bundled payment cohort with individuals with multimorbidity in the control cohort.

Two sensitivity analyses were performed to address the uncertainty in the results due to the specification of the intervention group. In the first, we changed the definition of the bundled payment group by assigning individuals to the intervention group at the period that they were actually enrolled in a bundled payment rather than the time-invariant "ever been assigned" that was used in the main analysis. In the second sensitivity analysis, we excluded a small percentage of individuals from the intervention group who were partly funded based on a management fee construction for the provision of the chronic care programmes, which covered only the expenditure of care co-ordination and ICT.

Results

Enrolment in bundled payments

The total number of individuals enrolled by the end of each year is displayed in Fig. 1. There was a large increase in the number of individuals with bundled payments after the formal implementation in 2010. In each programme the number of enrolees grew each year. In 2015, VRM had the largest number of included participants (752,183) while COPD was the smallest (146,005).

Baseline comparisons

Table 1 compares the treatment group, i.e. individuals who have ever been in the bundled payment, and control group in 2008 after inverse probability weighting for each bundled payment. In the first half of 2008 the total half-year expenditure ranged from €1,176

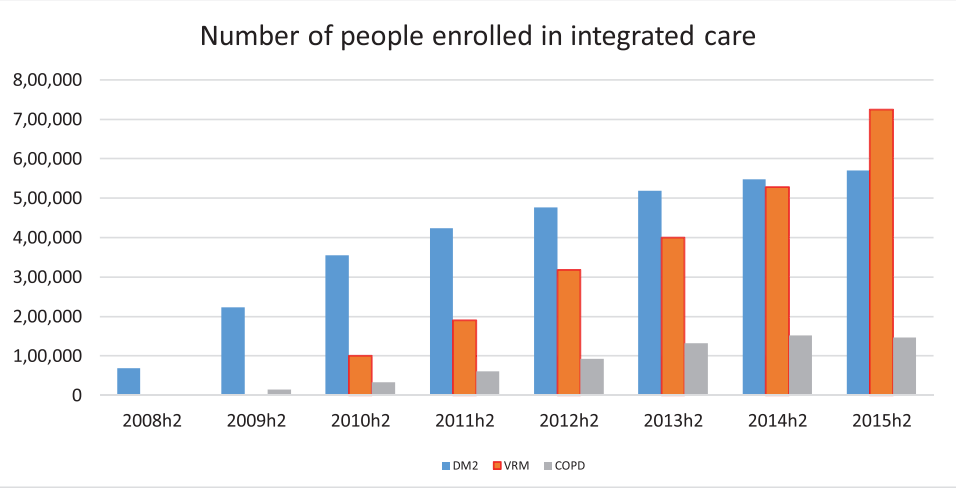

Fig. 1. Enrolment numbers in COPD/VRM/Diabetes per year from 2008 to 2015. Measurement is taken in the second half of the year.

Table 1
Comparison of intervention and control group after inversed probability weighting.

	DM2		VRM		COPD	
	Intervention	Control	Intervention	Control	Intervention	Control
Chronic Aspecific Respiratory Disorders	7%	7%	6%	6%	32%	31%
High Cholesterol	30%	32%	24%	27%	20%	20%
Diabetes type II, with hypertension	10%	7%	0%	0%	2%	1%
Diabetes type II, without hypertension	11%	9%	0%	0%	1%	1%
Psychological conditions	7%	7%	5%	5%	8%	8%
Heart condition	9%	10%	4%	5%	7%	7%
Pharmacy cost group in 2008	59%	59%	35%	39%	50%	53%
Multimorbidity in 2008	24%	23%	8%	8%	18%	17%
Female	49%	47%	52%	51%	48%	49%
Mean Age (SD)	62 [13]	62 [14]	61 [12]	61 [13]	60 [14]	60 [14]
Socioeconomic status in quarters						
1 (lowest)	29%	30%	22%	22%	26%	26%
2	24%	23%	27%	26%	25%	25%
3	23%	22%	26%	26%	25%	25%
4 (highest)	25%	25%	25%	25%	24%	24%
Died during observational period	14%	15%	5%	6%	10%	12%
N	807,197	988,480	1,039,406	988,480	267,843	988,480
Cost per half-year						
Medication (SD)	€ 373 (782)	€ 395 (853)	€ 233 (634)	€ 246 (649)	€ 348 (679)	€ 354 (918)
Mental health care (SD)	€ 171 (2,277)	€ 148 (2,123)	€ 98 (1,684)	€ 101 (1,595)	€ 191 (2,311)	€ 181 (2,421)
Primary care (SD)	€ 93 (75)	€ 77 (66)	€ 72 (54)	€ 67 (54)	€ 87 (69)	€ 75 (67)
Aids and Devices (SD)	€ 97 (382)	€ 116 (429)	€ 43 (314)	€ 42 (258)	€ 54 (286)	€ 65 (341)
Medical specialist care (SD)	€ 905 (3,440)	€ 1,032 (3,907)	€ 659 (2,643)	€ 726 (2,998)	€ 821 (3,094)	€ 932 (3,713)
Total (SD)	€ 1,728 (4,509)	€ 1,853 (4,871)	€ 1,176 (3,433)	€ 1,248 (3,697)	€ 1,587 (4,203)	€ 1,692 (4,848)
Rubin's B		17.9		10.8		16.5
Rubin's R		1.4		0.1		0.2

Number of participants, % of participants with relevant Pharmacy Cost Group (PCGs), % with multimorbidity (MM), % with PCG, mean of age and % in each SES, and % female. All in 2008. Mean and SD costs of total and top 5 categories in 2008 (first half-year) in euros. All after PSM. Note that the weight applied to each individual in the control group is different per chronic condition. SES cut-offs are determined based on national cut-offs.

for an individual enrolled in the VRM bundle to €1,728 in the diabetes bundle. Medication and medical specialist care were the largest expenditure categories. All three bundled payments contained people with multimorbidity, with the highest percentage in the diabetes bundle (24%).

Matching with IPW appeared to be successful as indicated by the diagnostic values for Rubin's R and Rubin's B and the minuscular differences in patient characteristics and healthcare costs between the intervention group and the control groups at baseline (i.e. 2008). There were only small differences on the pharmacy cost groups, which is a reflection of the bundled payments in which the intervention group is enrolled (e.g. a higher percentage of the diabetes pharmacy cost groups in the diabetes bundled payment group than in the control group). The comparison of the cohorts at baseline before inverse probability weighting is reported in Appendix 2.

Effect of bundled payment on healthcare expenditure

Fig. 2 displays the fully adjusted treatment effects of bundled payments by chronic disease and cost category. For diabetes, in comparison to the control group, total spending increased by €266 (95%CI: 253-279) per patient in the first half-year of claiming bundled payment. This is an increase of approximately 15% compared to the first half-year cost of 2008. In every half-year period after enrolment, the cost of those enrolled in bundled payments was higher than those that were not enrolled, and the difference increased over time to €362 (95%CI: 295-430). Similar patterns were

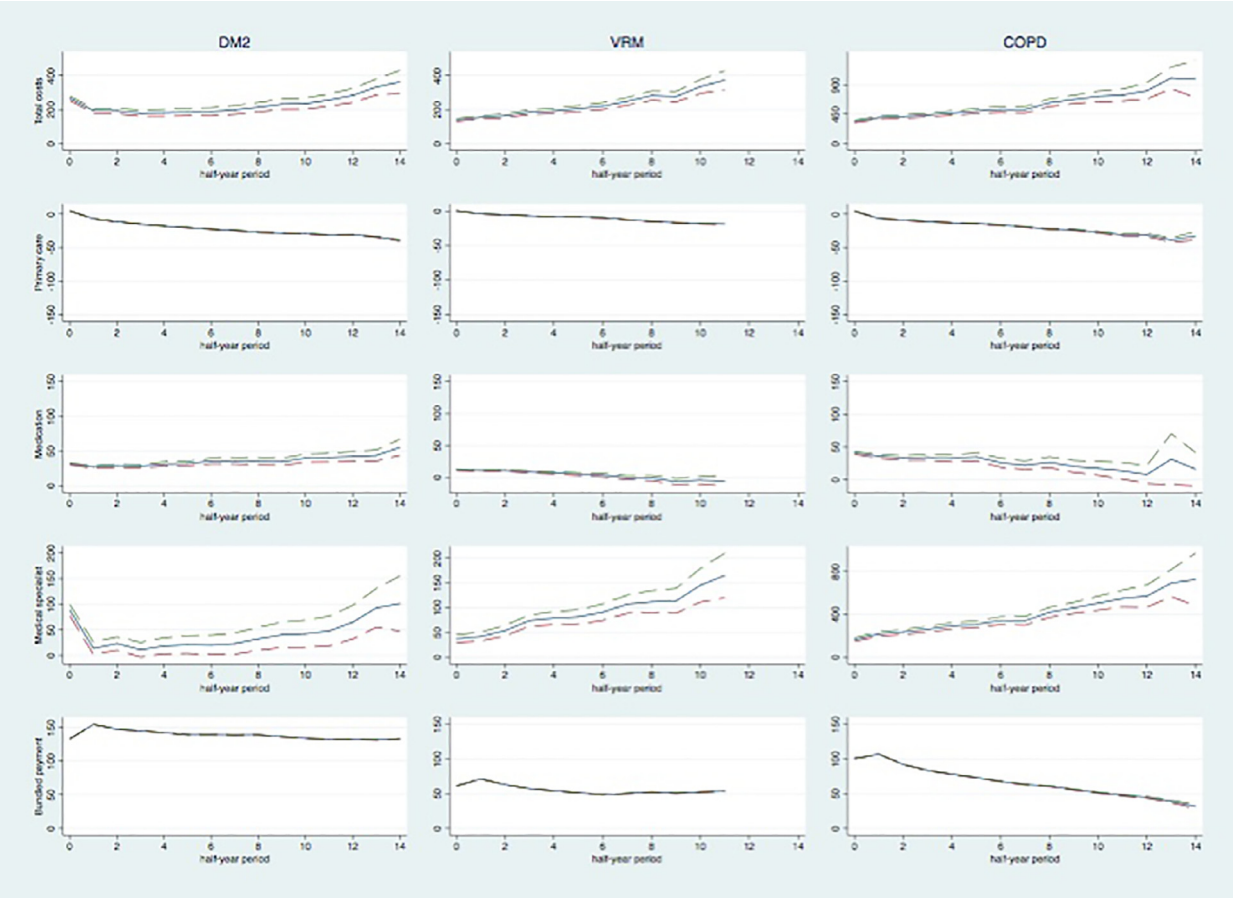

Fig. 2. Difference-in-difference estimates and confidence intervals for total expenditures and for separate cost categories, for COPD, Diabetes Mellitus type 2, VRM (in Euros).

present for VRM (€139 95%CI: 129-148 increase in the first period and €373 95%CI: 318-429 in the last) and COPD (€338 95%CI: 316-360 increase in the first period and €987 95%CI: 705-1,268 in the last). Full regression results are shown in Appendix 3.

In comparison to the control group, an increase was observed in medication and medical specialist care categories but not for primary care (excluding the bundled payment), which saw a small decrease. For diabetes, primary care cost excluding the bundled payments eventually decreased by €39 (95%CI: -41- -38) in the 15th half-year period after intervention, with similar effects in COPD and VRM. In the first period the total expenditure increase for diabetes was driven primarily by the bundled payment expenditure of €133 (95%CI: 133-134; 50% of total expenditure increase), medical specialist expenditure of €88 (95%CI: 78-99; 33% of total expenditure increase), and medication expenditure €32 (95%CI: 30-33; 12% of total expenditure increase). Similar patterns were observed for VRM, where in the first period the bundled payment itself was responsible for 53% of the total increase, whereas medical specialist expenditure and medication expenditure were responsible for 32% and 10% of the increase. For COPD, these percentages were 48%, 30%, and 12%.

Results of the robustness analyses

The healthcare expenditure in the intervention and control groups followed similar trends prior to the introduction of bundled payments for the three chronic diseases, with only a very small difference in trend between them (see Appendix 4) indicating that the parallel trends assumption can be justified. The reverse causality test indicated that the treatment effect was smaller in the periods prior to inclusion in bundled payment compared with the average treatment effect across all time periods. That strengthened our confidence that the difference-in-difference estimates represent the causal effect of bundled payments on expenditure.

Results of the sensitivity analysis

The first sensitivity analysis, in which we changed the definition of the intervention group, confirmed the expenditure increase found in the main analysis. The difference-in-difference estimate for diabetes increased by an average of about 50%, whereas the estimates for VRM and COPD decreased by about 35% relative to our baseline finding. The results of the second sensitivity analysis, where we excluded the people who were financed using the management fee structure, were similar to our main analysis but there was an increase in the estimated impact by about 10% for COPD and decrease by about 20% for VRM relative to our baseline finding (all sensitivity results provided in Appendix 5).

Effect of bundled payment on healthcare expenditure of individuals with multimorbidity

Fig. 3 reports the effect of bundled payments for two subgroups, those with and without multimorbidity. For all three programmes, the mean increase in expenditure per half-year period was substantially higher for those with multimorbidity than for those without multimorbidity. The difference is particularly high for VRM with an increase of 129% on average, while for diabetes

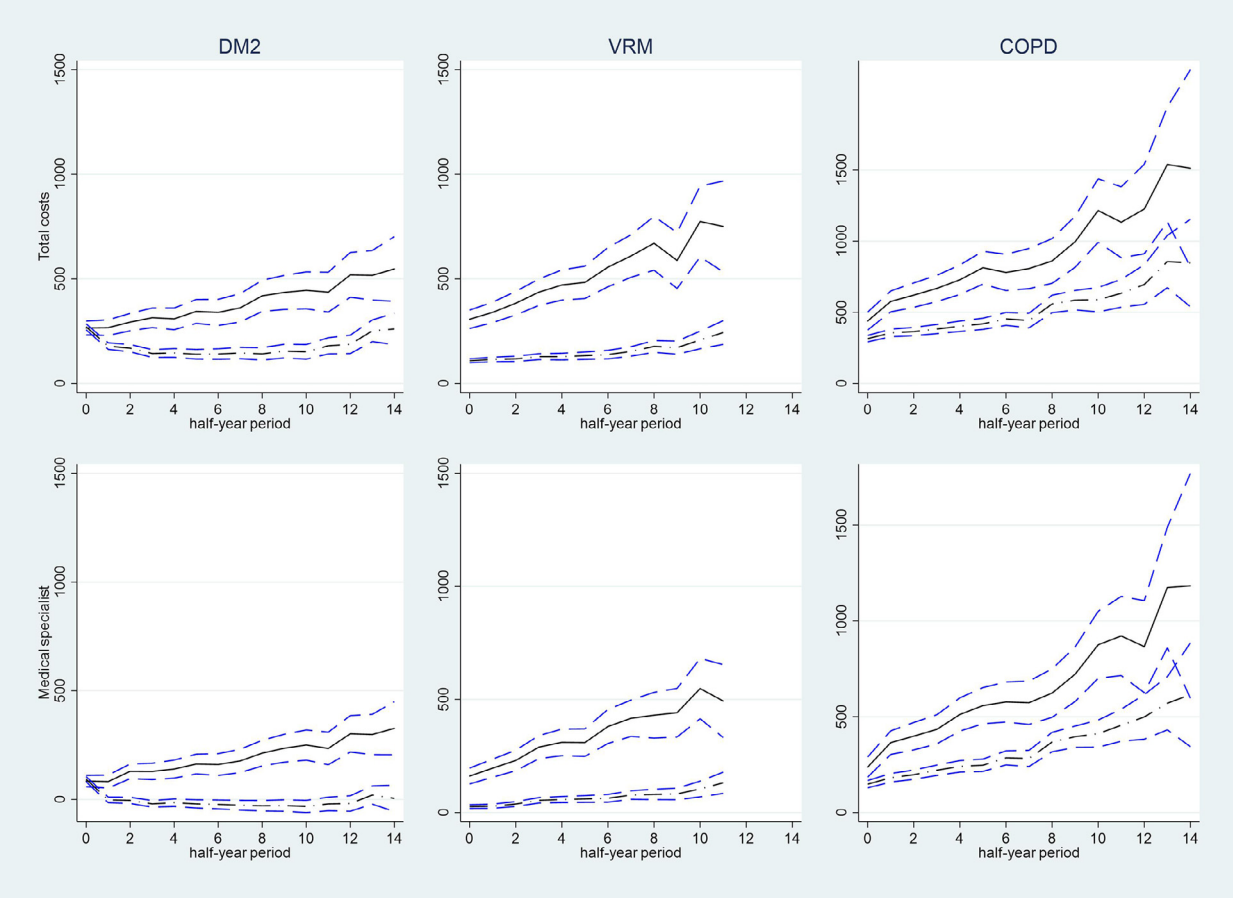

Fig. 3. Difference-in-difference estimates, and confidence intervals split by those with and without multimorbidty per bundled payment and for the separate cost category of medical specialist care. Solid lines for those with MM and dotted lines for those without MM (in Euros).

it was an increase of about 65% and for COPD it was an increase of 76%. For diabetes almost all of the overall extra expenditure in medical specialist care was driven by extra expenditure for those with multimorbidity (full results shown in Appendix 3).

Discussion

Discussion of main findings

This study provides the first long-term evaluation of bundled payments in the Netherlands. Since 2010, there has been a large increase in people enrolled in bundled payments for DM2, COPD, and VRM. We found no evidence that the introduction of the bundled payments led to a reduction in total and secondary care expenditures per person enrolled in the long term. Hence, the previously reported increase in health care expenditure in the first two years of the introduction of the DM2 bundled payment [30] persists over a long period. The bundled payment itself accounted largely for the increase in total healthcare expenditure. In addition, there were increases in medication and medical specialist care. Regarding expenditure for primary care services outside the bundle, we found that bundled payment led to marginal reduction, which is in line with the expectations since primary care providers could no longer claim services now covered by the bundled payments. When looking at expenditure for all primary care services (including the bundled payment), the increase may be explained by more services being provided to people in the bundled payment as well as by higher prices for the same primary care services. This increase was expected as it directly results from the expansion of services offered in primary care, but the expectation that this increase would be offset by savings in secondary care as a result of substitution, prevention and earlier recognition of progression seemed to be wishful thinking.

Multi-morbidity is known to be a major cost driver, and in our study we found that expenditure increases compared to the control group differed significantly between patients with multimorbidity and patients without [52,53]. While the bundled payment constituted the largest proportion of the increase in total expenditure of people with a single morbidity, for those with multimorbidity the expenditure for medical specialist care contributed to the increased total expenditure as well. There could be several reasons for this. Bundled payment could have increased the use of specialist care by multimorbid patients because unmet needs were identified. The increase could also be related to the disease-specific scope of the clinical guidelines that underlie each bundled payment. Even though these guidelines include a chapter on managing co-morbidities, clinical guidelines for single diseases do not account for the complex needs of patients with multimorbidity. Using multiple, single-disease guidelines can potentially lead to increased adverse drug reactions due to polypharmacy [43,54]. Another reason might be that GPs attempt to avoid costs that exceed the bundled payment (i.e. try to break-even or increase profit margin), which incentivizes them to refer the more complex patients with multimorbidity to secondary care. Benchmarking of general practitioners to reduce variation in referrals and financial incentives to reward reduction in avoidable referrals to specialist care might be a solution [55].

Strengths and limitations of our study

An important strength of our study was that we had data from all those enrolled in a bundled payment for chronic primary care management of DM2, VRM and COPD, since its implementation. We did not have to take a sample. We took great care in creating a comparable control group. Furthermore, we investigated the impact on total healthcare expenditure, enabling us to capture the impact of relevant substitution effects and compensation mechanisms.

Our study was subject to several limitations. First, there might be residual confounding due to the non-randomized study design. However, this risk was mitigated by combining propensity score matching with difference-in-difference analysis and having two types of controls for each patient included in the bundled payment group, i.e. those patients that never entered the bundled payment cohort and those that entered the cohort later. Second, we did not include expenditure covered by supplemental voluntary insurance because we had no access to these data. However, this was just a small proportion of total healthcare expenditure, i.e. about 10% in 2016. Third, we could not distinguish between overall cost and cost related to the chronic disease of the bundle payment because the claims database does not include the reason of the healthcare utilization.

Lastly, we focused on expenditure while acknowledging that stakeholders are also interested in improvements in health outcomes, patient experience, and efficiency, which are on the causal pathway to reduction in expenditure in the long term [56]. However, this was beyond the scope of the current study. In the scientific literature there are no publications on the effect of the VRM and COPD bundled payments on quality indicators, although the annual monitoring reports of INEEN report improvements in process indicators and intermediate outcome indicators across the chronic care programs. The evaluation of the short-term effects of the DM2 bundled payments reported that there were improvements in these indicators as well as substitution from secondary to primary care [16]. There has also been a claim of substitution by pointing at the stability of the total number of diabetes diagnosis-related groups in secondary care over time despite the increasing prevalence of diabetes [32]. However, if that would have been different between patients in the bundled payment and control group it would have led to a reduction in total or specialist care expenditure per person due to bundled payment. We did not observe that. Because we investigated total and not disease-related expenditure, any decrease in diabetes-specific healthcare expenditure due to bundled payment might be diluted in the overall expenditure. However, this does not seem to be very likely because there was even an increase in total healthcare expenditure in patients without multimorbidity.

Although not a limitation, it should be noted that we studied the effect of bundled payment on the expenditure *per patient* and not on the overall expenditure in the Netherlands. In recent years, i.e., between 2015 and 2109 we have seen a decrease in the overall bundled payment expenditure for diabetes/VRM by two percent annually [57]. However, this only pertains to this specific category of expenditure in isolation and is probably due to a combination of stricter inclusion criteria and a reduction in negotiated prices per bundle.

Lessons for other countries

The international community could draw valuable lessons from the Dutch experience with bundled payments, when developing approaches to financing integrated care. Our findings suggest that the current design of the bundled payments is particularly ill-suited to reduce expenditure for patients with multimorbidity. A reason could be that the scope of the bundled payments is limited [10] as it only covers one disease and multi-disciplinary services from the primary care sector only. Medication, diagnostic tests, medical devices and care by medical specialists in outpatient hospital clinics or hospital wards are excluded from bundled payments. Even some primary care services that are part of integrated chronic care programmes are only partially covered by the bundled payment. Furthermore, bundled payment incentivizes broadening the indication in order to increase the number of patients included in a bundled payment (over-coding), an incentive similar to a fee-for-service payment.

To remove the incentive to exclude complex patients from the bundle to prevent cost overruns (i.e. cream-skimming) and to avoid over-coding, integrated care programmes should involve "whole-person accountability" and payments should cover all services needed by a patient and provided to a multidisciplinary provider group accountable for more than just disease-specific needs [9,58]. This is the underlying payment model of accountable care organisations (ACOs) in the United States [27,28], where this model is often combined with shared savings between provider and payer and/or pay-for-performance. There is evidence that population health management by ACOs can lead to net cost savings in the long term [59,60]. Well-known examples in Europe [8,29] include the population health management of the Gesundes Kinzigtal initiative in Germany [30] and the subsequent introduction in the United Kingdom (UK) of GP fundholding, primary care groups (PCGs) and integrated care systems (ICSs) [31,32].

Recent initiatives in the Netherlands include the proposal by INEEN to integrate the existing disease-specific bundles into one bundle for patients with multimorbidity [61]. Although this could be an intermediate step, we feel that we should fully move away from the disease-specific integrated care initiatives to truly person-centred care initiatives. Although such initiatives are still mainly situated in primary care, small steps have been taken to experiment with population health management and shared savings contracts[[33]]. However, expanding the scope of the payment bundle would require contextual changes, such as larger organisational units (either physical or virtual) capable of taking on higher financial risk. One of the things this requires is time to build trust between providers and organisations within and across sectors [33].

Conclusion

This long-term evaluation study found that bundled payments for DM2, COPD, and VRM in the Netherland increased healthcare expenditure per patient. The increase was driven by the bundled payments themselves and by increased use of medical specialist care and medication. The expenditure increase due to bundled payments was much higher for patients with multimorbidity compared with patients with a single chronic disease. These findings provide a learning experience for the design of bundled payments around the world and signal the importance of considering the needs of persons with multimorbidity that may require a more comprehensive payment model.

Declaration of Competing Interest

The authors do not have any conflict of interest

Funding statement

The SELFIE project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 634288.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.healthpol.2021.04.004.

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