

Satisfaction of Township Hospitals Health Workers on Performance-based Salary in China

Beibei Yuan (✉ beibeiyuan@bjmu.edu.cn)

China Center for Health Development Studies, Peking University <https://orcid.org/0000-0002-9397-735X>

Xuan Zhao

China Center for Health Development Studies, Peking University

Yahang Yu

Department of Global Health, School of Public Health, Peking University

Hongni Zhang

School of college of industry and commerce, Shandong University of Management

Huiwen Li

China Population and Development Research Center

Chen Kong

Department of Global Health, School of Public Health, Peking University

Wei Zhang

Department of Global Health, School of Public Health, Peking University

Research Article

Keywords: job satisfaction, payment, primary health workers

Posted Date: July 13th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-678125/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Abstract

Background: Township hospitals (THs) are crucial primary health care providers in China health delivery system. Low job satisfaction of THs health workers has been one of biggest challenges to strengthening the primary health system in China. Even huge amount of studies confirming THs health workers ranked low remuneration level as one most important demotivating factor, few published studies explored the feelings of health workers on existing payment method design – a kind of Performance-based Salary System.

Objective: To analyze how key design of PBS influences the satisfaction of health workers with the intention to provide policy suggestions on how to improve the design of PBS, the motivation and performance of health workers in primary healthcare facilities.

Method: This study is a cross-sectional study, conducted in 47 THs in Shandong China. A total of 1,136 PCPs were recruited in the quantitative analyses. Expectancy theory was applied to design the measurements on designs of PBS. We analyzed the associations between PBS design and satisfaction of health workers using logistic regression.

Results: The three key components of PBS design were all related to the satisfaction status of health workers. Those health workers were aware of assessment methods were more likely to be satisfied with how they were paid (OR=2.44, $p<0.001$) compared with those being not aware of the assessment criteria and targets. The knowledge on personal performance was also associated with being satisfied with the payment methods (OR=3.34, $p<0.001$). The percentage of floating income in total income was negatively associated with the satisfaction, and one percentage point increase in floating income proportion could result in the possibility of feeling satisfaction decreased by 2.82% (95%CI -4.9 to -0.7, $p=0.01$). And when we grouped the health workers based on their value on monetary rewards, we found that only in those with lower value on monetary income, the negative influence of more floating income was significant.

Conclusions: When policymakers or managers tried to apply the performance-related payment methods to incentivise certain work behavior, they should pay attention to some design details, including keeping transparency in the performance assessment criteria, clear performance feedback each health worker, and setting the proportion of performance-related income based on the preference of health workers in certain cultural setting.

Background

China's health delivery system has a hierarchical system corresponding with administrative levels, consisting of health providers in national, provincial, prefecture, county, township (rural areas)/community (urban areas) and village level. Township hospitals (THs) are taking pivotal role in the three-tier delivery system of rural areas, connecting the hospitals and first contact provider village clinics. County and higher hospitals are in charge of providing specialized medical services for the covered population, and providing technical supports to medical services provision to lower level hospitals and THs. THs also take responsibility in training and supervising the village clinics (lowest level of healthcare delivery system) in providing first contact services to rural residents. Another special significant role of THs is also reflected in that THs having dual function in providing the rural population's with both basic medical services (clinical treatment for diseases) and public health services (preventive care, health management services and health information collection and management).

THs' operation status is influenced a lot by the overall health system development in China. Overall THs in China experienced three development stages[1]. During 1950s to 1970s, THs were purely government-run health facilities and undertook the roles of basic medical treatment and public health services provision. Together with other health delivery institutions, THs ever made great contributions to a reduction in the burden of communicable, maternal, and neonatal diseases during that period. Since 1980s market-based reform in the health sector resulting in inadequate government funding for THs, THs had to strive for making profits and maintaining operation by charging service fees and drug mark-ups from patients. The consequences are providing unnecessary and induced medical services and neglect of public health services provision, which then resulted in rural residents' high diseases financial risks and reduction in healthcare services accessibility. Since 2009 China launched the health system reform, with emphasis on strengthening the primary health system. Three major kinds of policies have been implemented. The first one is political commitments being ensured and public financial supports being increased to strengthen the infrastructure and capacity of primary healthcare providers, and THs are the major targets of new inputs and strengthening efforts. The second is eliminating mark-ups on drugs dispensed by THs and village clinics by zero-profit drug policy with aims to control their revenue pursuing behaviors; at the same time local governments needed to increase the budgets to balance THs' financial loss from drugs benefits, however this part of financial support is dependent on local government's financial capacity and cannot make up THs' drug revenue loss in most of cases. Another crucial policy is "Equalization of basic public health services" in which governments subsidize the THs (and the village clinics supervised by THs) based on the number of covered residents for providing the essential public health services package, which have been neglected during the market reform period[2]. Consequently, currently THs in China are funded by three major sources: government budgets for regular operation and medicine zero-makeup, government subsidies for essential public health services package, and revenues from medical services provisions (paid by health insurance funds or patients' out-of-pocket payment).

Under the current operation status of THs, the health workers of THs are employee of THs. A series of studies and a systematic review[3] have confirmed that the low job satisfaction of THs health workers in China. And in all kinds of influencing factors of job satisfaction, the financial rewards from work is still the most prominent factor causing job dissatisfaction, especially for those from rural areas in China and other LMICs[4]. The impacts of financial rewards on job satisfaction is through two ways: overall remuneration level, and how to pay the remuneration. In China, the pay level of health workers in THs was only about 30%-50% of their expected pay level[5]. Regarding the payment method to health workers in THs, it is a kind of performance-based salary (PBS) based on policy documents issued by national health authority. Total income of salary included two parts: one basic salary (60–70% of the total income) and one performance-based bonus salary (30–40% of the total income). To further improve the incentives, later policies repeatedly mentioned "enlarge the variation of total income distribution among THs employees" and "appropriately increase the proportion of performance-based bonus salary in total salary"[5]. However, within allowed range of national policy documents, the specific design of PBS varied in different areas and different THs in the same area, because current policies grant THs facility the autonomy of setting proportion of performance-based part in total salary. However, not like huge amount of studies confirming remuneration level as one important demotivating factor, few published studies explored the detailed design of PBS in THs and whether THs health workers were satisfied with current design of PBS.

"How to pay the health workers" has been confirmed by empirical studies and systematic review as important influencing factor of satisfaction and behaviors of health workers, this study will analyze the design of PBS in

THs of rural China, examine how the design of PBS influences the satisfaction of health workers with the intention to provide policy suggestions on how to improve the design of PBS, the motivation and performance of health workers in primary healthcare facilities.

Method

The design of this study is based on a classic motivation theory – expectancy theory[6] (Fig. 1). This theory hypothesizes that it is the individual “perceived” link between outcomes he/she will get with his/her work outputs guiding his/her work behaviors and feeling of fairness. The outcomes used for motivating health workers are usually the financial rewards, which are valued in the utility function of most of human beings based on traditional economy theory. If under certain design of payment system, health workers perceive that financial rewards come anyway or don't come regardless of the their effort level and work outputs, or if health workers do not value extra financial rewards, then this payment system will not work on changing work morale and behaviors. This theory emphasizes that the link between the financial rewards and work outputs must be realized and believed by health workers. For strengthening this belief on the link, PBS design need ensure that all workers are aware of the amount of financial rewards being followed from the explicit contents and levels of work performance (Link \boxtimes), all people concerned are aware of their performance (Link \boxtimes), and the amount financial rewards linked with the performance are meaningful compared with their total income (Link \boxtimes). And all these designs work only if health workers value the extra financial rewards.

Based on the above theory and hypothesis, a cross-sectional survey study was designed.

Data collection

We conducted a cross-sectional study in three counties of Shandong province. Located in eastern China, Shandong Province is the second largest province in terms of the population and the third ranking province in terms of GDP per capita per year. Three counties including Shouguang, Huantai and Yanggu were randomly selected to represent the province's high-, middle- and low-level economic region. All the THs in these three counties were selected, with 16 from Shouguang, 13 from Huantai, and 18 from Yanggu. All the primary healthcare workers on duty on the investigation day were informed to participate in the structured questionnaire survey and a total of 1139 participants recruited. The study has been approved by the Ethics Review Board of the School of Public Health, Peking University. Informed consent was obtained from all participants prior to questionnaire administration.

Measures and variables

Based on the above theory, this study hypothesizes that a well-designed PBS strengthening the link between rewards and outputs can help health workers built clear expectation on their behavior direction, efforts and corresponding rewards, and will be more satisfying for health workers.

We used three variables to measure the design of PBS in THs, including “Awareness on the performance assessment criteria”, “Awareness on the performance of yourself”, and “The perceived proportion of performance-based salary in total income”.

The dependent variable, satisfaction of health workers on PBS, was measured on a 5-point Likert scale from 1 (very dissatisfied) to 5 (very satisfied), the 5-point Likert scale was collapsed into a binary category of dissatisfied (very dissatisfied, dissatisfied, moderate) and satisfied (satisfied, very satisfied) in analysis.

We also controlled some other factors potentially influencing the satisfaction on PBS. Firstly, we used “The financial income being one of three top motivators for me” (yes, no) to measure level of health workers’ preference on monetary rewards, as the theory basis assumed the extent of value on monetary income could influence whether PBS design working in changing satisfaction and behavior of health workers. We also controlled some factors potentially influencing the satisfaction on PBS design, including the satisfaction on total income level (satisfied, very satisfied), gender (female, male), age (< 25, 25–35, 35–45, 45–55, ≥ 55), educational background (high school or below, junior college, bachelor and above), and some work-related covariates including professional status (lower than primary, primary, intermediate, senior/deputy senior), employment status (permanent, temporary), type of primary healthcare workers (physician, nurse, public health worker), and dual work (yes, no).

Statistical analysis

The total participants were divided into three subgroups according the types of job (Fig. 1) for sample description and some comparison among health workers with different types of job. THs health workers were classified into physicians, nurses, public health workers (PHWs) according to the department where they are working (clinical department or public health department). Descriptive statistics were used to describe the characteristics of the THs health workers with different types of job. Chi-square tests were conducted to determine the differences among three types of health workers.

Then we applied multivariate logistic regression to identified the influencing factors of satisfaction on PBS, especially whether “Awareness on the performance assessment criteria”, “Awareness on the performance of yourself”, and “The perceived proportion of performance-based salary in total income” affected satisfaction on PBS. The participants were split into two groups by satisfaction on income (dissatisfied and satisfied), and we conducted multivariate logistic regression for two subgroups to identify the association between satisfaction on total income level and satisfaction on PBS design. The odds ratios (ORs) and their corresponding 95% confidence intervals (CI) were reported. All comparisons were 2-sided and were considered statistically significant as $p < 0.05$. The quantitative data was analyzed using Stata14 and missing data was omitted.

Result

Basic characteristics of participants and PBS design in THs

Table 1 showed the characteristics of participants. This study consisted of 1136 health workers in THs, including 43.49% ($n = 494$) being physicians working in clinical department and mainly providing inpatient and outpatient services, 24.47% ($n = 278$) being nurses, and 32.31% ($n = 367$) being public health workers working in public health department and mainly providing preventive and management care. Compared with physicians (19.27%, $n = 95$) and nurses (10.21%, $n = 28$), higher percentage of public health workers was in group of aged higher than 45 (21.37%, $n = 78$). Physicians had higher education background with 48.79% ($n = 436$) obtaining bachelor or higher degree, and public health workers had lowest education background with 29.43% ($n = 108$) only graduating from higher middle school. In the investigated physicians, higher proportion of them were permanently employed (87.65%, $n = 433$), which implied their salaries were mainly from government financing; lower proportion of nurses (64.03, $n = 178$) and PHWs (69.21%, $n = 254$) were permanently employed by THs, which implies nurses and PHWs were more likely to be paid by earnings of THs.

The investigated health workers also had their subjective judgement on the design of PBS based on their experiences. We found that the median of percentage of floating income in total income is 16.67%, which means on average 16.67% of total income is believed by health workers being bundled with their performance. Physicians (16.67%) and nurses (17.00%) had the similar subjective prediction on the level of performance-based income proportion, but in the opinion of PHWs the percentage of floating income was relatively lower (11.63%). Majority of health workers (75.18%) were aware of performance assessment methods, i.e. the performance requirements of managers. And most of investigated health workers (79.86%) were also aware of their performance level evaluated by managers.

Three kinds of health workers did not differ in their value on financial income, with on average half (49.87%) of them rating income as the factors they valued most compared with other factors, which included training, promotion, infrastructure and equipment in work place, etc. Only 21.72% of health workers were satisfied with the total income level they got from current work. Nearly half of them (43.87%) can feel the PBS design satisfying, and PHWs (52.51%) had higher level of satisfaction on PBS design than physicians (39.34%) and nurses (40.52%).

Table 1
Characteristics of investigated health workers in THs

Characteristics	Overall n = 1139, n (%)	Physician n = 494, n (%)	Nurse n = 278, n (%)	Public health workers n = 367, n (%)	<i>p</i>
Gender					
Male	397 (34.95%)	267 (54.16%)	2 (0.72%)	128 (34.97%)	< 0.001
Female	739 (65.05%)	226 (45.84%)	275 (99.28%)	238 (65.03%)	
Age					
<25	53 (4.68%)	16 (3.25%)	21 (7.66%)	16 (4.38%)	< 0.001
25–34	335 (29.59%)	118 (23.94%)	95 (34.67%)	122 (33.42%)	
35–44	543 (47.97%)	264 (53.55%)	130 (47.45%)	149 (40.82%)	
45–54	155 (13.69%)	66 (13.39%)	27 (9.85%)	62 (16.99%)	
≥55	46 (4.06%)	29 (5.88%)	1 (0.36%)	16 (4.38%)	
Educational Background					
Bachelor and above	436 (38.28%)	241 (48.79%)	104 (37.41%)	91 (24.80%)	< 0.001
Junior college	479 (42.05%)	178 (36.03%)	133 (47.84%)	168 (45.78%)	
High school or below	224 (19.67%)	75 (15.18%)	41 (14.75%)	108 (29.43%)	
Professional title					
Senior/deputy senior	17 (1.50%)	14 (2.85%)	0 (0.00%)	3 (0.82%)	< 0.001
Intermediate	394 (34.77%)	203 (41.26%)	103 (37.18%)	88 (24.18%)	
Primary	504 (44.48%)	223 (45.33%)	130 (46.93%)	151 (41.48%)	
Lower than primary	218 (19.24%)	52 (10.57%)	44 (15.88%)	122 (33.52%)	
Employment status					
Temporary	274 (24.06%)	61 (12.35%)	100 (35.97%)	113 (30.79%)	
Permanent	865 (75.94%)	433 (87.65%)	178 (64.03%)	254 (69.21%)	< 0.001

Characteristics	Overall n = 1139, n (%)	Physician n = 494, n (%)	Nurse n = 278, n (%)	Public health workers n = 367, n (%)	p
Percentage of floating income					
Median	16.67%	16.67%	17.00%	11.63%	< 0.001
<15%	428 (37.58%)	167 (33.81%)	93 (33.45%)	168 (45.78%)	< 0.001
15%-29.99%	398 (34.94%)	192 (38.87%)	113 (40.65%)	93 (25.34%)	
>=30%	313 (27.48%)	135 (27.33%)	72 (25.90%)	106 (28.88%)	
Knowledge on assessment method					
No	271 (24.82%)	108 (22.69%)	74 (26.91%)	89 (26.10%)	0.350
Yes	821 (75.18%)	368 (77.31%)	201 (73.09%)	252 (73.90%)	
Knowledge on performance					
No	225 (20.14%)	96 (19.67%)	64 (23.53%)	65 (18.21%)	0.242
Yes	892 (79.86%)	392 (80.33%)	208 (76.47%)	292 (81.79%)	
Value on income					
Low	568 (49.87%)	251 (50.81%)	122 (43.88%)	195 (53.13%)	0.057
High	571 (50.13%)	243 (49.19%)	156 (56.12%)	172 (46.87%)	
Satisfaction on income level					
Unsatisfied	883 (78.28%)	389 (79.39%)	222 (80.14%)	272 (75.35%)	0.253
Satisfied	245 (21.72%)	101 (20.61%)	55 (19.86%)	89 (24.65%)	
Satisfaction on PBS					
Unsatisfied	623 (56.13%)	293 (60.66%)	160 (59.48%)	170 (47.49%)	< 0.001
Satisfied	487 (43.87%)	190 (39.34%)	109 (40.52%)	188 (52.51%)	

The influencing factors of satisfaction with salary payment methods

Table 2 showed results of logistic regression in the total sample and provided the association between PBS design characteristics and health workers' salary payment methods, controlling basic personal/job characteristics of health workers.

The work role was associated with the satisfaction level. Compared with physicians be in charge of clinical services provision, nurses were (OR = 1.80, 95%CI 1.18 to 2.75, p = 0.01) more likely to be satisfied with how they were paid, and PHWs were (OR = 2.05, 95%CI 1.37 to 3.06, p < 0.001) more likely to be satisfied with existing PBS.

The design of PBS could influence the satisfaction status of health workers. The percentage of floating income in total income was negatively associated with the satisfaction, and one percentage point increase in floating income proportion could result in the possibility of feeling satisfaction decreased by 2.82% (95%CI -4.9 to -0.7, p = 0.01). Those health workers were aware of assessment methods were more likely to be satisfied with how they were paid (OR = 2.44, p < 0.001) compared with those being not aware of the assessment criteria and targets. The knowledge on personal performance was also associated with being satisfied with the payment methods (OR = 3.34, p < 0.001).

Table 2
The Association between basic characteristics/PBS design and health workers' satisfaction on payment methods (All sample)

	β	OR	Std. Error	β 95% CI	P
Gender (Control: Male)					
Female	-0.26	0.77	0.18	[-0.62,0.1]	0.16
Age (Control: <25)					
25–34	-0.52	0.59	0.38	[-1.27,0.23]	0.17
35–44	-0.17	0.84	0.40	[-0.96,0.62]	0.67
45–54	-0.06	0.95	0.45	[-0.94,0.83]	0.90
≥ 55	0.24	1.27	0.61	[-0.95,1.43]	0.69
Educational Background (Control: Bachelor and above)					
Junior college	-0.10	0.91	0.18	[-0.45,0.26]	0.58
High school or below	-0.19	0.83	0.25	[-0.69,0.31]	0.45
Professional status (Control: Senior/deputy senior)					
Intermediate	0.11	1.12	0.62	[-1.1,1.32]	0.85
Primary	0.48	1.61	0.63	[-0.75,1.71]	0.45
Lower than primary	0.56	1.74	0.67	[-0.76,1.87]	0.41
Employment status (Control: Temporary)					
Permanent	0.34	1.41	0.23	[-0.1,0.79]	0.13
Work role (Control: Doctor)					
Nurse	0.57	1.76	0.22	[0.13,1.01]	0.01
Public health workers	0.66	1.94	0.21	[0.25,1.07]	0.00
Percentage of floating income	-2.82	0.06	1.06	[-4.9,-0.75]	0.01
Knowledge on assessment method (Control: No)					
Yes	0.89	2.44	0.20	[0.5,1.28]	< 0.001
Knowledge on performance (Control: No)					
Yes	1.21	3.34	0.25	[0.72,1.69]	< 0.001
Value on income (Control: Low)					
High	0.39	1.48	0.26	[-0.12,0.9]	0.13

Different influencing factors for health workers with different value on financial income

The influences of PBS design on the satisfaction were different for the health workers with different preference on monetary income. As Table 3 shows, in health workers with higher value on monetary income, those having awareness on the assessment methods (46.32% being satisfied v.s. 14.01% being satisfied, $p < 0.001$) were more likely to be satisfied with the payment methods; those having awareness on the performance of themselves (46.51% being satisfied v.s. 11.20% being satisfied, $p < 0.001$) were more likely to be satisfied with the payment methods. For those health workers with lower value on monetary income, the influences of PBS design on satisfaction feelings became weak. As Table 3 shows, in those with higher value on monetary income, the associations between awareness on assessment methods/performance and satisfaction were not significant statistically. However, in those with lower value on monetary income, the negative association between proportion of floating income in total income and satisfaction status became significant, and higher proportion of floating income was associated lower possibility of feeling satisfied ($\beta = -5.00$, $p = 0.04$).

Table 3

The association between PBS design and satisfaction on payment methods for health workers with different value on financial income

Satisfaction with payment methods	<i>High value on financial income</i>				<i>Low value on financial income</i>			
	Satisfied (%)	Dissatisfied (%)	P	β95%CI	Satisfied (%)	Dissatisfied (%)	P	β95%CI
Gender								
Male	41.21	58.79			53.81	46.19		
Female	37.04	62.96	0.86	-0.04 [-0.46, 0.38]	47.83	52.17	0.01	-1.03 [-1.84, -0.22]
Age								
<25	34.62	65.38			67.86	32.14		
25–34	42.53	57.47	0.54	-0.28 [-1.17, 0.62]	49.66	50.34	0.07	-1.43 [-2.96, 0.1]
35–44	35.58	64.42	0.97	0.02 [-0.92, 0.96]	46.67	53.33	0.33	-0.79 [-2.39, 0.8]
45–54	37.33	62.67	0.79	-0.14 [-1.2, 0.92]	54.55	45.45	0.73	0.32 [-1.5, 2.13]
≥55	42.11	57.89	0.44	0.53 [-0.82, 1.88]	55.17	44.83	0.45	-1.19 [-4.24, 1.87]
Educational Background								
Bachelor and above	39.25	60.75			48.83	51.17		
Junior college	37.39	62.61	0.71	-0.08 [-0.5, 0.34]	48.28	51.72	0.53	-0.24 [-1, 0.51]
High school or below	38.18	61.82	0.69	-0.12 [-0.69, 0.46]	56.76	43.24	0.29	-0.58 [-1.65, 0.5]
Professional status								

	<i>High value on financial income</i>				<i>Low value on financial income</i>			
Senior/deputy senior	30.00	70.00			62.50	37.50		
Intermediate	33.68	66.32	0.61	0.39 [-1.09, 1.87]	48.28	51.72	0.64	-0.68 [-3.53, 2.18]
Primary	38.87	61.13	0.47	0.56 [-0.95, 2.07]	47.52	52.48	0.84	0.30 [-2.6, 3.21]
Lower than primary	45.61	54.39	0.44	0.63 [-0.96, 2.23]	59.18	40.82	0.76	0.48 [-2.62, 3.58]
Employment status								
Permanent	36.08	63.92	0.29	0.27 [-0.23, 0.77]	47.06	52.94	0.18	0.73 [-0.33, 1.78]
Temporary	44.30	55.70			62.28	37.72		
Work role								
Doctor	36.93	63.07			41.74	58.26		
Nurse	34.21	65.79	0.17	0.35 [-0.15, 0.86]	48.72	51.28	< 0.001	1.48 [0.49, 2.46]
Public health workers	43.11	56.89	0.03	0.54 [0.05, 1.02]	60.73	39.27	0.01	1.17 [0.29, 2.04]
Percentage of floating income	--	--	0.05	-2.36 [-4.73, 0.01]	--	--	0.04	-5.00 [-9.64, -0.36]
Knowledge on assessment method								
No	14.01	85.99			32.73	67.27		
Yes	46.32	53.68	< 0.001	1.01 [0.56, 1.46]	53.50	46.50	0.15	0.65 [-0.23, 1.54]
Knowledge on performance								

	<i>High value on financial income</i>				<i>Low value on financial income</i>			
No	11.20	88.80			17.00	83.00		
Yes	46.51	53.49	< 0.001	1.22 [0.66, 1.77]	57.24	42.76	0.15	0.93 [-0.16, 2.01]

Discussion

Based on the expectation theory, in this study we hypothesized that a satisfying PBS design should strengthen the link between rewards and outputs, increase the awareness of health workers on their work outputs, and set an appropriate proportion of performance-linked rewards in the total income. The analysis on data from three counties in Shandong Province of China found that the health workers being aware of assessment methods and having knowledge on personal performance were linked to the satisfaction with PBS, and the increase in floating income proportion was linked with decreased possibility of feeling satisfaction. The analysis also found that the influences of being aware on assessment and performance on satisfaction were only significant in those health workers with strong preference on financial rewards, and the negative influence of increasing proportion of floating income was only found in those health workers with lower preference on financial rewards.

Being aware of assessment methods was found to be positively related to satisfaction of health workers in THCs in this study. Theoretically, being clear on the performance assessment criteria can build the perceived link between different levels of their performance and different levels of income they can get, which helps health workers set clear performance and income targets and is the basis for satisfying their preference on the monetary rewards. International evidences have shown that financial incentive to reward the better performance is one of most effective measures to improve the morale and change the behaviour of health workers [7]. But the empirical studies on the feeling of workers with this aspect of PBS design is limited. Fu's study collecting data from three provinces in China also found that self-reported link between income and performance assessment was related to satisfaction of health workers with the payment methods[8]. Some findings support that the linkage between promotion and performance can also increase the work satisfaction in China, and the promotion in professional title in PHIs directly brought the income increase[9].

This study also found that having knowledge on personal performance was linked to the satisfaction of health workers with PBS. Job feedback through different ways, including the feedback of manager, patients and public performance reporting, has been proved as an important motivator for health workers[10–12]. Knowing the performance level can help health workers understand the gap to target and make the judgement on fairness, and then help to improve the performance if the feedback is combined with the supportive suggestions. Studies in China also have the same findings, the performance feedback and public reporting were both correlated with satisfaction of health workers [8].

Analysis on this survey data shows that the percentage of floating income in total income was negatively associated with the satisfaction. One possible reason is the data of this study being from Shandong province, where the Confucius cultural was born and relatively follows traditional Chinese cultural strongly, so collectivism, doctrine of the mean, preference on stability are more dominate in the culture of work place[13], and then the

health workers are more likely to have positive feeling on less floating and competitive payment methods. Existing studies mainly analyzed the relationship between proportion of performance-based income and the behaviors of health workers, and have varied findings under different settings, and several systematic reviews have confirmed that it was hard to get conclusion on it because the heterogeneity in specific payment design and contexts[14, 15]. Some studies concluded that low proportion of income being linked to performance was not enough to motivate the behavior of health workers and improve the performance [16, 17], and little gap in income levels of health workers with difference performance could not incentivate the performance improvement[18]. One study used data in PHIs health workers in China found that higher level of performance-based rewards was related to better control of blood pressure for the contracted patients[19]. The influence of floating income on feelings of health workers seems be in opposite direction of it on behaviour of health workers, even few empirical studies tested the relationship between the proportion of floating income and feelings of health workers. Theoretical analysis based on self-determinant theory explains that too much financial incentives would destroy the intrinsic motivation, and reduce the the enjoy of health workers on the tasks in the long term[20, 21]. Some qualitative studies found that pay-for-performance directly using financial incentive to guide the behavior directions of health workers were detrimental to autonomy and professionalism of health professionals[22, 23]. Though bonding income with performance could push health workers to work harder on the incentivated targets as earning more income being a driver of health workers to make efforts, the fatigue of efforts and pressure also decrease the utility of health workers at the same time[24]. So each individual health workers would determine the direction of their behavior and efforts level to balance the utility increase from expected income and utility decrease from fatigue of efforts[25], and in the balance process those with less value on income will have lower willingness to make efforts for performance target. As what we found in this study, the relationship between higher proportion of performance-based income and lower satisfaction was more significant in those health workers with lower preference on monetary rewards, which meant linking too much proportion of income with performance was not welcome by health workers with less value in monetary income.

In this study, it was also found that work role was related to the satisfaction with PBS, especially the public health workers being more satisfied with PBS design compared with doctors. In China Equalization of Basic Public Health Services (EBPHS) policy defines a basic public health services package, which are provided by PHIs (THs and Community Health Centers) to their covered residents. In THs, public health workers are mainly in charge of EBPHS tasks, with doctors coordinating in some works related to clinical technologies, like physical check-up for the elderly. Policy EBPHS strongly emphasizes the need to track performance and has designed explicit performance targets to ensure the uniform enforcement of the service packages[2]. Accordingly in the facility level, the performance assessment criteria for individual public health workers is also designed according to the requirement of policy on EBPHS package, and the performance criteria usually is the rewards for each instance of public health service provision, like 15 Yuan RMB for each diabete patients follow-up management[26]. In addition to clear performance assessment methods, EBPHS funds are all from government subsidies and are more stable and predictable once the performance targets are achieved. In contrast, the revenues from providing medical services, the main resources to pay doctors and nurses, are more dependent on medical insurance fund and out-of-pocket payment of patients. Together with the performance criteria of doctors being quantity of clinical services provided, so the income of doctors is closely related to the volume of patients, all of which implies higher level of instability in doctors' income level. In summary, the higher level of satisfaction of public health workers on PBS is due to clear performance assessment methods and less floating income level,

which are both in accordance with the above findings on relationship between several PBS design characteristics with the satisfaction of PHWs on PBS.

Several limitations of our study should be mentioned. First, this study used the cross-sectional data and could only find the correlation between PBS design characteristics and satisfaction of health workers, and we can not draw any causal inference from our findings. The results should not be interpreted as the effect of the PBS design characteristics on satisfaction of health workers. Second, the measurements on perception of health workers on design of PBS were designed by research team because there are no validated scale on evaluation of performance-based payment design. Lastly, this study only explore the relationship between PBS design and feeling of health workers, and we did not look at the possible influence of payment design on behavior. Satisfaction, as an important emotional state and feeling health workers receive from the work, is one of the most predictor of mobility, productivity and service quality of health workers[6]. In addition, only analysis on feeling of health workers on payment design is also crucial for the welfare of health workers and sustainability of payment methods on performance. Rather, the association found in this study also reminded that the different direction of influences on feelings and performance, and even linking more income with performance may stimulate the behaviour change in certain time period, this impact may not be sustainable if this design cannot improve the satisfaction of health workers in work place.

Conclusion

Based on survey data from three counties of Shandong Province in China, this study found that clarifying the link between rewards and performance targets, increasing the awareness of health workers on their performance, and set an appropriate proportion of performance-linked rewards in the total income, were also related to primary health workers being satisfied with the design of their payment methods. If policymakers or managers of primary health institutions are using the performance-related payment methods to incentivise certain work behavior, and they should pay attention to some design details, including keeping transparency in the performance assessment criteria and levels of rewards for different performance, implementing feedback of performance to each health workers, and setting the proportion of performance-related income based on the preference of health workers in certain cultural setting with awareness on the high competitive payment system not being acceptable by all culture and work places.

Declarations

Ethics approval and consent to participate

The study has been approved by the Ethics Review Board of the School of Public Health, Peking University. Informed consent was obtained from all participants prior to questionnaire administration.

Consent for publication

Not applicable.

Availability of data and materials

The data that support the findings of this study are available on request from the corresponding author, Beibei Yuan, upon reasonable request.

Competing interests

There are no competing interests.

Funding

This work was supported by the National Natural Science Foundation of China (grant number 71403008). The study sponsor has no role in study design, data analysis and interpretation of data, the writing of manuscript, or the decision to submit the paper for publication.

Authors' contributions

BY developed the study design. XZ and YY conducted data analysis and interpretation. BY, XZ and YY drafted the manuscript. All authors reviewed the manuscript, provided revisions and approved the final manuscript.

Acknowledgements

Not applicable.

References

1. Feng X, Martinez-Alvarez M, Zhong J, et al. Extending access to essential services against constraints: the three-tier health service delivery system in rural China (1949–1980). *International Journal for Equity in Health*. 2017;16:49. <http://doi.org/10.1186/s12939-017-0541-y>.
2. Yuan B, Balabanova D, Gao J, et al. Strengthening public health services to achieve universal health coverage in China. *BMJ*. 2019;365:l2358. <http://doi.org/10.1136/bmj.l2358>.
3. Li H, Yuan B, Wang D, et al. Motivating factors on performance of primary care workers in China: a systematic review and meta-analysis. *BMJ Open*. 2019;9:e28619. <http://doi.org/10.1136/bmjopen-2018-028619>.
4. Sabitova A, Sajun SZ, Nicholson S, et al. Job morale of physicians in low-income and middle-income countries: a systematic literature review of qualitative studies. *BMJ Open*. 2019;9:e28657. <http://doi.org/10.1136/bmjopen-2018-028657>.
5. Ma X, Wang H, Yang L, et al. Realigning the incentive system for China's primary healthcare providers. *BMJ*. 2019;365:l2406. <http://doi.org/10.1136/bmj.l2406>.
6. Dolea C, Adams O. Motivation of health care workers-review of theories and empirical evidence. *Cah Sociol Demogr Med*. 2005;45:135–61.
7. Rynes SL, Gerhart B, Parks L. Personnel psychology: performance evaluation and pay for performance. *Annu Rev Psychol*. 2005;56:571–600. <http://doi.org/10.1146/annurev.psych.56.091103.070254>.
8. Fu Y, Zhang M, Liu Y. Effects of performance appraisal among health workers in township health centers: a heterogeneity analysis. *Chinese Journal of Public Health*. 2017;33:1390–3.

9. Robles-Garcia M, Dierssen-Sotos T, Martinez-Ochoa E, et al. Variables related to job satisfaction. Cross-sectional study using the European Foundation for Quality Management [EFQM] model. *Gac Sanit*. 2005;19:127–34. <http://doi.org/10.1157/13074368>.
10. Baines R, Regan DBS, Stevens S, et al. The impact of patient feedback on the medical performance of qualified doctors: a systematic review. *BMC Med Educ*. 2018;18:173. <http://doi.org/10.1186/s12909-018-1277-0>.
11. Ivers N, Jamtvedt G, Flottorp S, et al. Audit and feedback: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev*. 2012:D259. <http://doi.org/10.1002/14651858.CD000259.pub3>.
12. Werner RM, Asch DA. The unintended consequences of publicly reporting quality information. *JAMA*. 2005;293:1239–44. <http://doi.org/10.1001/jama.293.10.1239>.
13. R K, M M. Introduction: motivational models in developing countries. In: “Work Motivation: models for developing countries”. New Delhi. Sage Publications; 1994.
14. Diaconu K, Falconer J, Verbel A, et al. Paying for performance to improve the delivery of health interventions in low- and middle-income countries. *Cochrane Database Syst Rev*. 2021;5:D7899. <http://doi.org/10.1002/14651858.CD007899.pub3>.
15. Scott A, Sivey P, Ait OD, et al. The effect of financial incentives on the quality of health care provided by primary care physicians. *Cochrane Database Syst Rev*. 2011:D8451. <http://doi.org/10.1002/14651858.CD008451.pub2>.
16. Epstein AM. Will pay for performance improve quality of care? The answer is in the details. *N Engl J Med*. 2012;367:1852–3. <http://doi.org/10.1056/NEJMe1212133>.
17. Li J, Hurley J, DeCicca P, et al. Physician response to pay-for-performance: evidence from a natural experiment. *Health Econ*. 2014;23:962–78. <http://doi.org/10.1002/hec.2971>.
18. Gerhart B, Trevor CO. Chapter 5 Merit pay. *Performance Management Systems: A Global Perspective*; 2008.
19. Jing R, Mahmoudi E, Lai X, et al. The Association Between Panel Size and Health Outcomes of Patients with Hypertension in Urban China: a Population-Based Retrospective Cohort Study. *J Gen Intern Med*. 2021. <http://doi.org/10.1007/s11606-021-06681-0>.
20. Gillam SJ, Siriwardena AN, Steel N. Pay-for-performance in the United Kingdom: impact of the quality and outcomes framework: a systematic review. *The Annals of Family Medicine*. 2012;10:461–8. <http://doi.org/10.1370/afm.1377>.
21. Deci EL, Olafsen AH, Ryan RM. Self-Determination Theory in Work Organizations: The State of a Science. In: Morgeson FP, ed. *Annual Review of Organizational Psychology and Organizational Behavior*; 2017:19–43.
22. Qaseem A, Snow V, Gosfield A, et al. Pay for performance through the lens of medical professionalism. *Ann Intern Med*. 2010;152:366–9. <http://doi.org/10.7326/0003-4819-152-6-201003160-00006>.
23. Khan N, Rudoler D, McDiarmid M, et al. A pay for performance scheme in primary care: Meta-synthesis of qualitative studies on the provider experiences of the quality and outcomes framework in the UK. *BMC Family Practice*. 2020; 21:142. <http://doi.org/10.1186/s12875-020-01208-8>.
24. Kanfer R. Measuring health worker motivation in developing countries. Bethesda Maryland Abt Associates Partnerships for Health Reform; 1999.
25. Bennett S, Franco LM, Kanfer R, Stubblebine P. The Development of Tools to Measure the Determinants and Consequences of Health Worker Motivation in Developing Countries; 2001.

26. Yang L, Sun L, Wen L, et al. Financing strategies to improve essential public health equalization and its effects in China. *International Journal for Equity in Health*. 2016;15:194. <http://doi.org/10.1186/s12939-016-0482-x>.

Figures

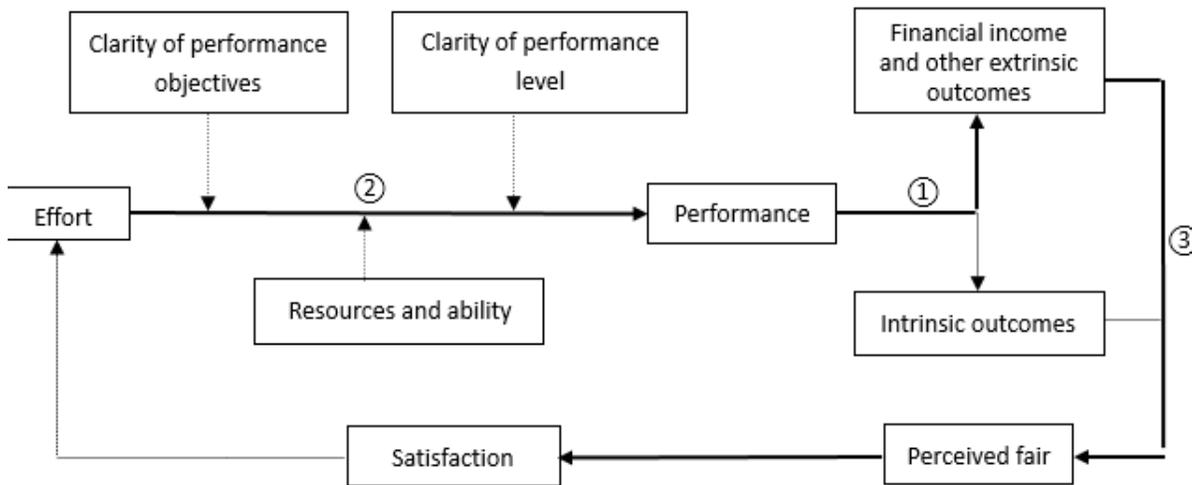


Figure 1

The framework of this study based on expectancy theory