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Attitude of potential biobank donors screened for depression towards disclosure of individual health results

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Abstract
Background. Research based on biological material with linked health and clinical data may produce new strategies for disease prevention, diagnosis and treatment. A survey was conducted among individuals previously screened for major depressive disorder (MDD) to explore participants' attitude towards research biobanking.
Methods. The survey used self-report questionnaires about donation for research biobanks, self-perceived health and life satisfaction. Means and percentages were compared across groups by using t test, ANOVA and chi-square test.
Results. Of 416 subjects who underwent the MDD screening, 51 (12.2%) responded to the survey, with the majority of them (42) agreeing to the use of their biological samples only in absence of feedbacks about health or diseases. Agreement towards biobanking was not affected by life satisfaction or self-perceived health.
Conclusions. Our findings show a prevailing preference against health results disclosure among MDD-screened subjects, suggesting a role of personal – particularly psychosocial – factors in research biobanking individuals' contribution.

Key words
- research biobanks
- donors
- individual health results
- depression
- mental health

INTRODUCTION

The importance and value of biobanking in health research has been growing during the last decades mostly due to genetic knowledge advancements and technology innovation. It is undeniable that, until now, biological materials have mostly been collected in the context of specific single scientific studies; however, recent outbreaks such as that of COVID-19, which can take tremendous advantage from appropriate biobanking, pose an urgent challenge to these activities: to increase potential donors trust towards large – rather than single study driven – collections of biomaterials for synergetic biomedical research. Actually, potential donors for both disease oriented and population biobanks, deserve particular attention, being a bit overlooked under the great pressure and major concerns regarding the collaboration of stakeholders such as Academia, research institutions and industry [1].

In the context of mental health, research based on the use of biological material with linked health information and clinical data may produce new strategies for prevention, early detection, accurate diagnoses, and tailored treatments [2]. In particular, among psychiatric disorders, major depressive disorder (MDD) is the most frequent, persistent and debilitating disorder occurring in the general population, with an estimated lifetime prevalence of approximately 12.8% in Europe [3]. Moreover, MDD has major public health implications. In fact, it is the fourth leading cause of worldwide disease burden accounting for 12% of all years lived with disability, and has severe consequences in terms of economic costs [4]. In a high proportion of patients, neither is MDD recognized nor treated adequately [5].

Together with a "moral duty" to participate in research biobanks [6], it is important to highlight the emerging importance of psychosocial wellbeing of potential donors for the success of research biobanks. Psychosocial wellbeing is, in fact, one of the core "welfare interests" at stake in the process of establishing an organized collection of biological samples and associated data for health research. Therefore, coping with psychosocial wellbeing represents a central duty that the biobanking endeavour has to accomplish. In some respects, this "core" interest enlarges the concept of individual's welfare in research upon which the ethical debate has been focusing for a long time [7], placing it in the highest

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ranking of the issues to be addressed by both researchers and Internal Review Boards.

The present study is part of the SET-DEP project (Screening and Enhanced Treatment for DEPression in Primary care, in Rome, Italy) funded by the Italian Ministry of Health [8], whose main objective was to test the feasibility and effectiveness of a program for early detection and treatment of depression in primary care. One secondary objective of the SET-DEP project was the donation and biobanking of saliva from the participants for future research purposes. We report the results obtained with a mail survey that explored, beforehand, the attitude of the SET-DEP participants towards biological material donation for research purposes. In particular, the focus of the survey was on the importance these potential donors attributed to the future disclosure of individual health results in relation to donors' decision about the use of their biomaterials.

MATERIALS AND METHODS

This study aims at exploring the attitude of the SET-DEP participants towards the potential future disclosure of individual health results when participating in research biobanking, with the underlying hypothesis that the agreement towards the use of the biomaterials for research purposes might be influenced by perceived health and/or by life satisfaction of the potential donors.

Study population

Participants were healthy individuals recruited from 13 urban general internal medicine practices, located in central Rome, Italy, from January 2009 to June 2010. They were previously asked to undergo a screening for MDD by means of specific questionnaires. The study inclusion criteria were age 18-65 and absence of psychosis or severe cognitive impairment as clinically determined by the primary care physicians according to anamnesis, prescription medicines, and medical history. The physicians or their assistants informed the eligible participants about the SET-DEP project, its aims and objectives including the collection of saliva for research purposes in a second phase of the project; fliers describing project aim and objectives were available in the waiting room.

Depression screening was performed by administering the Primary Care Screener for Affective Disorders (PC-SAD) [9], which is a 37-item self-administered questionnaire designed to screen for Major Depressive Disorder (MDD) and Dysthymic Disorder (Dys) in primary care. It consists of a 3-item pre-screener, a 26-item Major Depressive Disorder (MDD) section, and an 8-item Dysthymic Disorder section. The pre-screener consists of two depression questions and one dysthymia question, which are part of the screener score, but reduce respondent burden by terminating the questionnaire if all are negative. It has a sophisticated scoring algorithm that confers several advantages, such as the possibility to yield valid results even if many items are left unanswered. Its validity was first tested against other established screening questionnaires in health plan members, primary care outpatients, and psychiatric patients (Rogers et al 2002), and then was tested against a standardised psychiatric interview in dermatological inpatients [10] and in primary care patients [11].

After the screening for MDD, at the same time of the follow-up interviews or shortly later, a cross-sectional survey was launched. Both MDD positive and negative SET-DEP participants were administered a postal questionnaire to investigate preferences and concerns about biological material donation for research purposes.

Measures and questionnaires

The survey was conducted with a form for the collection of socio-demographic information, and with a validated questionnaire on the knowledge, attitude and willingness to donate biological material for research purposes used in previous research by our group [12]. In particular, the present study explored the agreement of respondents on the potential use of their biological samples for research purposes. Participants acceptance was operationalized as different levels of agreement with the following statement: "Would you agree with the potential use of your biological samples for research purposes?" Response statements were: a) "Yes, I would definitely agree"; b) "Yes, but only if results regarding my health or predisposition to diseases will be given to me"; c) "Yes, but only if results regarding my health or predisposition to diseases will not be given to me"; d) "No, I would not agree"; e) "I don't know". Furthermore, self-perceived health was measured on a four-point Likert scale (categories: "Bad", "Neither Bad nor Good", "Good", "Excellent") and the well-known and widely validated "Satisfaction With Life Scale" (SWLS) [13] was administered. Life satisfaction is a subjective, cognitive evaluation of an individual's life as a whole based on the fit between personal goals and achievements [14]. It is an indicator of subjective well-being, one of the main dimensions of mental health.

Statistical analyses

Descriptive analysis was performed by reporting means (with standard deviations) for continuous variables and percentages for categorical variables. To explore the association between variables, means and percentages were compared across groups by using t test or ANOVA and chi-square test respectively, with *alpha* set at 5%.

The Ethics Board of the Istituto Superiore di Sanità approved the SET- DEP project and an informed consent procedure was adopted to conduct the survey.

RESULTS

Out of the 416 SET-DEP participants who underwent the screening for MDD, 402 individuals received the mail questionnaire, and 51 subjects responded (12.2%). Respondents showed a similar distribution by sex, age, marital status and education level compared to the reference SET-DEP cohort, with only a slight overrepresentation of subjects with a university degree in our sample. The 51 respondents (12 males, 39 females) represented ages 19 to 66 years (mean age 49 years, median age 51 years). More than half were married and about 90% of them had at least a high school diploma. Of all respondents, 21 (41%) screened positive for

MDD (similar positivity rate compared to the reference SET-DEP cohort, 37%), with no difference in the positivity rate between genders [5 out of 12 males (41.67%) and 16 out of 39 females (41.03%) screened positive; chi-square test: p=0.97]. Positive subjects tended to be older (mean age 53 years) than negative ones (mean age 46 years; t test: p=0.06) *(Table 1)*.

As expected, MDD negative subjects reported a better self-perceived health (chi-square test: p=0.013) and a higher level of life satisfaction (t test: p<0.001) compared to positive ones *(Table 2)*.

Seven respondents (14%) declared they had already donated biological material (blood, saliva, urine, or other tissues) for research purposes in other research settings. Noteworthy, the large majority of respondents (42 subjects, >82%) declared they would agree to the potential collection and use of their biological samples for biomedical research purposes only if no feedback results regarding health or predisposition to any diseases would be given to them. This proportion was even higher in negative compared to positive subjects at the screening for MDD (90% *vs* 71% respectively; chi-square test: p=0.025) *(Table 2)*. The percentages of other response categories were negligible ["No, I do not agree" (5.9%), "Yes, but only if results regarding my health or predisposition to diseases will be given to me" (3.9%), "Yes, I definitely agree" (2%), "I don't know" (5.9%)].

Finally, the agreement towards research biobanking was not associated with self-perceived health (chi-square test: p=0.98) or life satisfaction (ANOVA: p=0.82).

Table 1
Socio-demographic characteristics and MDD screening for the study sample

Variables	N (%)	Mean (SD)
Age (years)		48.7 (12.3)
Gender		
Male	12 (23.5)	
Female	39 (76.5)	
Education		
Primary school	0 (0)	
Secondary school	2 (3.9)	
Vocational school	3 (5.9)	
High school	24 (47.1)	
3-year degree	2 (3.9)	
5-year degree	20 (39.2)	
Marital status		
Single	14 (27.4)	
Married or living with a partner	30 (58.8)	
Separated, divorced or widowed	6 (11.8)	
Missing	1 (2.0)	
Screening for depression		Mean age (SD)
Positive	21 (41.2)	52.5* (9.2)
Negative	30 (58.8)	46.1* (13.6)

* p=0.06 (t test)

DISCUSSION

Some lack of knowledge regarding study participants' perspectives and opinions on biobanks is well known among main stakeholders such as scientists, researchers and biobanks' sponsors [15]. It is our opinion that, especially for conditions of high public health relevance such as psychiatric illnesses, this gap has to be promptly filled in order to favour biobanking, and most of all, individuals' aware participation to these activities.

So far, many authors have focused on the effect of "non-welfare" interests on willingness to donate to a biobank [16-18]. It is widely recognized, in fact, that the willingness diminishes when the research scenario raises moral, religious or political concerns. Nevertheless, it is worth considering that other emerging concerns, more deeply linked to an individual psychosocial sphere, may also affect the compliance.

In our study, we found that a high percentage of subjects, though within a small sample, expressed concern about the potential disclosure of individual results, no matter whether these results were study results or incidental findings; they stated that such a disclosure would negatively affect their willingness to allow the use of their biomaterial and, consequently, to donate for research purposes.

This finding is quite odd in the landscape of studies on the same topic. In fact, regardless of the settings and type of participants surveyed, e.g. general population [19, 20], general population *vs* research participants [21], patients [22, 23], biobank effective participants *vs* potential participants [24, 25], a great majority of studies found that the disclosure of individual results is well accepted and can be even positively influential in the decision to donate. However, a few studies have already highlighted certain specific signals of the difficulties in disclosing individual health information. In this trend, for instance, Janssen and colleagues reported that patients are interested in receiving information when the disclosure regards very low risk events [26]. In the same line, Meulenkamp and colleagues [27] found that, even if only low percentages of individuals (both patients and healthy subjects) do not want to receive aggregate or individual results, the type of results in terms of severity of the conditions in question really matters for decision. Moreover, they also found that anxiousness, as perceived by respondents, is associated with lower preference for results information. Similar effects of anxiousness are detectable in other studies [28]. Among the SET-DEP respondents to our survey, we found a prevailing preference opposing the disclosure of individual results, not only among those who screened positive for depression but also – and even more – among those who screened negative. This suggests that there may be relevant personal factors influencing people's preferences with respect to the feedback of individual results, at least when psychiatric disorders such as anxiety or depression are at stake. Moreover, these preferences do not seem to depend on the health status or subjective wellbeing as perceived by respondents. A first straightforward hypothesis may be formulated, that interest in knowing the results of biosample testing could be markedly affected by fears

Table 2

Description of survey items by MDD screening test results

Variables	MDD Negative		MDD Positive		Total	
	N (%)	Mean (SD)	N (%)	Mean (SD)	N (%)	Mean (SD)
Agreement on the use of a biological sample for research purposes[§]						
I don't agree	0 (0%)		3 (14.3%)		3 (5.9%)	
Only if no results will be given to me	27 (90%)		15 (71.4%)		42 (82.4%)	
Only if results will be given to me	2 (6.7%)		0 (0%)		2 (3.9%)	
I definitely agree	1 (3.3%)		0 (0%)		1 (2%)	
I don't know	0 (0%)	#	3 (14.3%)	#	3 (5.9%)	
Previous donation of a biological sample for research purposes						
No	27 (90%)		15 (71.4%)		42 (82.4%)	
Yes	3 (10%)		4 (19.1%)		7 (13.7%)	
I don't know	0 (0%)		2 (9.5%)		2 (3.9%)	
Self-perceived health						
Bad	2 (6.7%)		4 (19.1%)		6 (11.8%)	
Neither bad nor good	12 (40%)		15 (71.4%)		27 (52.9%)	
Good	14 (46.7%)		2 (9.5%)		16 (31.4%)	
Excellent	2 (6.7%)	*	0 (0%)	*	2 (3.9%)	
SWL score		**25.6^ (4.4)**		**18.6^ (8.2)**		**22.7 (7.1)**

[§] For complete answer categories, see text; MDD, Major Depressive Disorder; SWL, Satisfaction with life.
#p=0.025 (chi-square test)
*p=0.013 (chi-square test)
^p=0.0003 (t test)

of negative consequences such as labelling, social stigma or discrimination [29] or risk to become more prone to depression and to compromise the successful management of symptoms. Considering that respondents voluntarily participated in the screening for MDD, a certain degree of concern for depression and mental disorders can be envisaged in all the respondents, irrespective of the results of the screening itself and, of note, irrespective of the fact that these results had already been communicated to the participants at the time the present survey started. Taking this latter aspect into account, the hypothesis may be enriched by a further consideration about the strength of a generalized concern not only for ascertained mental illnesses but also for a threat of mental illnesses.

Further factors, such as family history or social and cultural features of the individuals might also contribute to explain the results. Clearly, a pure selection bias may have occurred: our study sample represents subjects coming from the general population who voluntarily joined a screening programme, whose decision may have been highly influenced by fear of being at high risk for anxiety or depression on the basis, for example, of a specific personal or family history of the disease. Although the selection bias is possible, at the same time we have observed that the preference for not disclosing individual results is not driven by the perceived health status of respondents or by the level of subjective wellbeing that can be considered as a proximal measure of anxiety and depression, and this finding would deserve further and deeper investigations. Furthermore, our sample shows a high education level that in itself has often been associated with a major selectiveness regarding the type of "information" individuals wish to receive when participating in research [30].

The survey has two main methodological limitations. First, a low response rate has produced a small sample size that makes the results prone to random variability; in this respect, the SET-DEP project may have strained the potential participants as the request to participate in this survey partly overlapped with other requests and the follow-up interviews planned in the project. A second limitation is that the questionnaire item regarding the disclosure of individual health results did not specify any "diseases" or "syndromes", and consequently, no information was provided to respondents about different therapeutic scenarios. Therefore, we cannot exclude that the knowledge of specific treatments or cures regarding the potential health results to be disclosed might have produced different findings in a similar survey.

Nevertheless, this study also has a few strengths, such as the use of a validated questionnaire and the fact that our sample, though small, closely reflects the main socio-demographic characteristics and the MDD positivity rate of the reference SET-DEP cohort.

CONCLUSIONS

The survey provides cues for reflection on the importance of welfare interests in biobanking, particularly psychosocial wellbeing of individuals, and their potential impact on research that makes use of biological sample collections. The rate of disagreement towards potential health information disclosure among study respondents is too high to be ignored, and therefore, we consider these results as clues of several factors that would be worth being further investigated, such as psycho-social, cultural and communication-related factors. Moreover, the fact that a small proportion of the SET-DEP participants replied to this survey make it possible to hypothesize that non-respondents were even less "interested" in or less sensitive to biobank participation, and this, in general, might represent a pitfall for the biomedical research biobank enterprises, which urgently calls for improvement.

Given the important role that biobanking activities currently play in the field of mental disorders and other diseases that challenge medical actionability, we consider these results worth of further testing in larger samples, taking into account explanatory factors not necessarily related to mental health. It will be of note to disentangle the complex interplay of personal, psychological and social factors shaping the contribution of study participants and potential biobank donors, as well as to assess the "psychological burden" that both healthy and diseased individuals variously have to withstand to contribute effectively to research biobanking.

Authors' contributions

VT contributed to the study conception and design, supervised data collection and drafted the manuscript. CF contributed to the study design, performed statistical analysis and revised the manuscript for important intellectual content. AG contributed to the study conception and revised the manuscript for important intellectual content. AP contributed to the supervision of data collection and revised the manuscript for important intellectual content. MAS contributed to the study conception and revised the manuscript for important intellectual content.

Availability of supporting data

The minimum dataset analyzed during the current study is available from the Corresponding Author on reasonable request.

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Conflict of interest statement

The Authors declare that they have no competing interests.

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